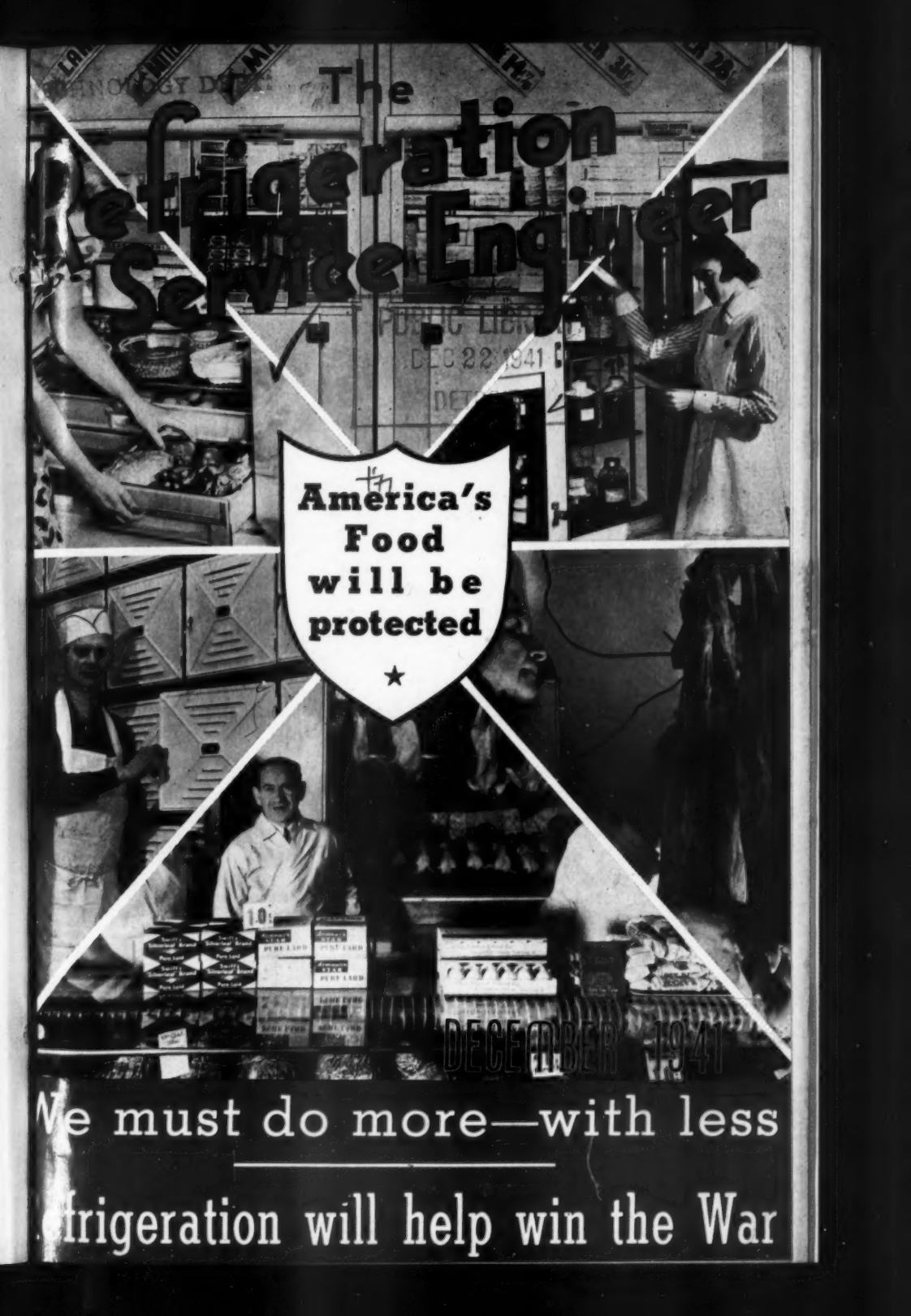
The
Refrigeration
Service Engineer
America's
Food
will be
protected
DECEMBER 1941
We must do more—with less
Refrigeration will help win the War

TRADE MARK

Rotary Seal has pioneered in the manufacture of mechanical shaft seals. Because of this specialization, it offers the best in shaft sealing.

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An open letter to Uncle Sam

VIRGINIA SMELTING COMPANY

Liquid Sulphur Dioxide — Methyl Chloride

WEST NORFOLK, VIRGINIA

December 10th 1941.

Uncle Sam,
United States of America.

Dear Uncle Sam:

If you think "Virginia" Refrigerants are needed FIRST on the ships that guard our shores, in the mills and factories that are making bitter pills for Hitler, or, in the bases, camps and outposts that shelter our soldier sons - "Virginia" will deliver the goods.

If you think our products, our special skills can better serve to bolster the health, the morale, the vitality of our people, America's Home Line of Defense, if you want to keep civilian supply lines intact, distribution equitable - if that is how we can help the most - "Virginia" will deliver the goods.

Half-way measures don't count this time; we're seeing you through to the finish.

We want to work for you, not worry you!

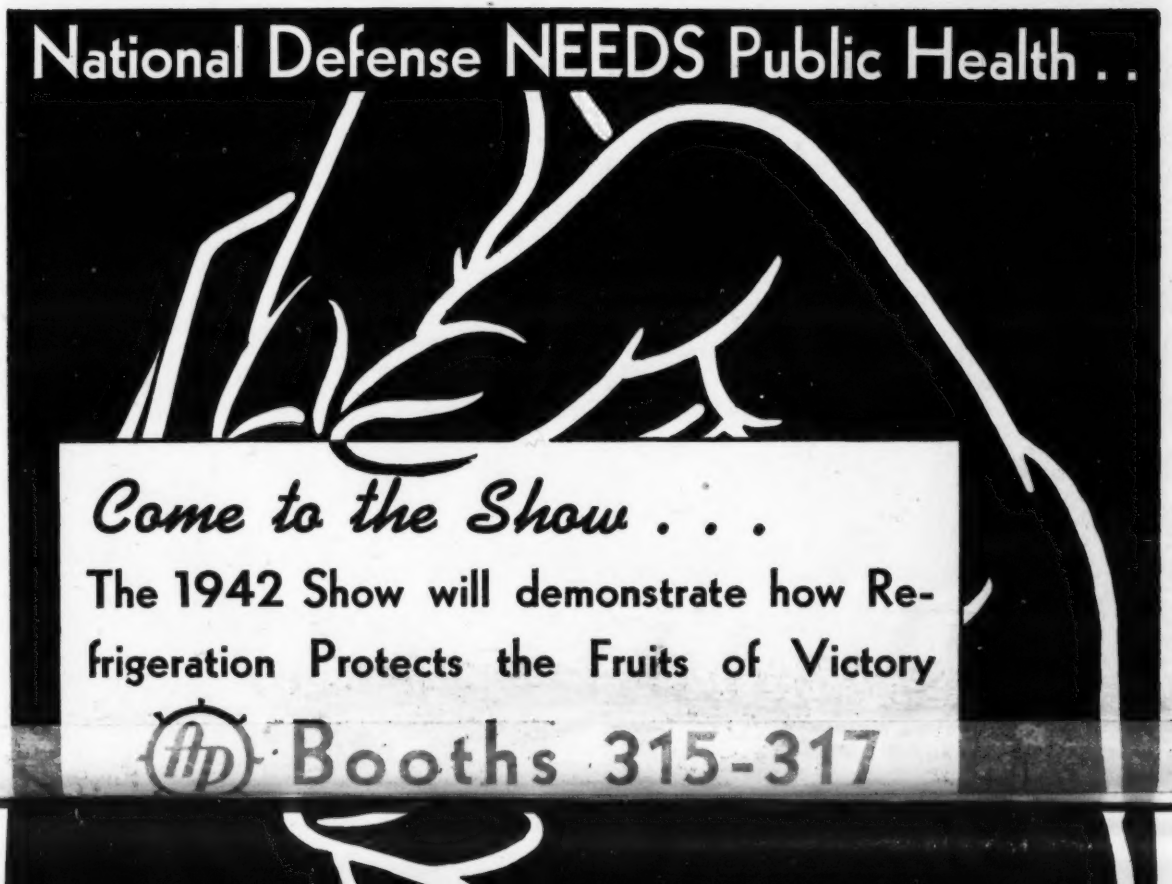
Yours sincerely,
VIRGINIA SMELTING COMPANY.

rhl/jh
CC:

FOURTH ANNUAL ALL-INDUSTRY
REFRIGERATION and AIR CONDITIO
EXHIBITION EQUIPMENT, PARTS, MATERIAL, SUPPLIES AND ACCESSORIES — STEVENS HO — JANUAR

V...

VIRGINIA SMELTING CO.
WEST NORFOLK, VIRGINIA


National Defense NEEDS Public Health . .
Come to the Show . . .
The 1942 Show will demonstrate how Refrigeration Protects the Fruits of Victory
Booths 315-317

Booths 315-317

This year you have TWO extremely important reasons for attending our Industry's greatest Show — important subjects that will closely effect your business and your profits throughout the coming year.

One

New Products, New Methods that aid you to . . .

DEFENSE CONSERVATION

Two

Product-Improvements that increase operating efficiency—and help you to higher profits.

★ Progressive Service Engineers Use and Recommend—and Aggressive Jobbers Stock and Talk A-P Products.

At the A-P Booths 315-317 . . . we'd like to show you what we've done to conserve for National Defense while effecting important improvements in A-P Products. You'll find this booth interesting and profitable. We'll enjoy meeting our friends again at the Refrigeration Industry's annual get-together.

AUTOMATIC PRODUCTS COMPANY
2454 NORTH THIRTY — SECOND STREET
MILWAUKEE WISCONSIN

DEPENDABLE Refrigerant Valves

Public Health NEEDS Refrigeration

Your Support

–for the FOURTH ALL-INDUSTRY REFRIGERATION and AIR CONDITIONING EXHIBITION

–is needed!

WE believe everyone in the Refrigeration and Air Conditioning Industry, whether service man or user—whether manufacturer or jobber—should make every effort to attend the Fourth All-Industry Exhibition, January 12 to 15, 1942 at the Stevens Hotel, Chicago.

The Industry faces many difficult problems for 1942—you will face many equally serious and troublesome problems during the year. And the way for all of us to solve them is to face these problems together.

When you come to the Show we cordially invite you to visit the Imperial exhibit at Booths 502 to 506. There at first hand we can discuss your problems in-so-far as they relate to items that are essential in the handling of new installations and the maintenance and repair of old jobs.

We hope to see you at the show.

THE IMPERIAL BRASS MFG. CO., 1204 W. Harrison, Chicago

IMPERIAL

STRAINERS • DEHYDRATORS • VALVES • FITTINGS • FLOATS • CHARGING LI OLS

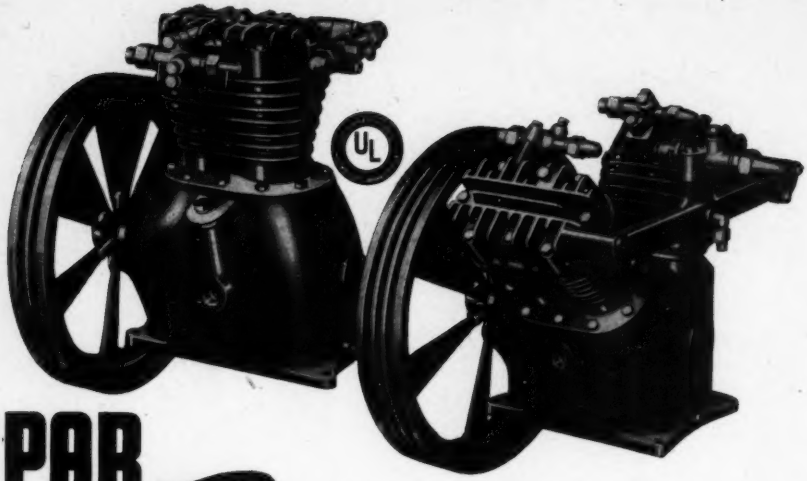
REFRIGERATION IN NATIONAL DEFENSE

• Since Refrigeration and Air Conditioning have grown so rapidly in the last decade we hardly realize how extremely important this new Industry is in the life of the nation. Food storage and preservation, whether commercially or in the home, is going to be more important than ever before and both Refrigeration and Air Conditioning are going to play a more important part in getting even greater efficiency out of the workers of Industry.

Even a little Imperial Copper Tube Fitting like the one shown here is playing its part. For, along with many other products in the Imperial line, the operation of plants and systems everywhere is dependent on such accessories and in the tools needed for both installation and repairs.

Air Conditioning and Refrigeration Products

OLS FOR CUTTING, FLARING, BENDING, COILING, PINCH-OFF AND SWEDGING



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The *Right* Replacement

- **RIGHT** . . . because these compressors are precision-built for long trouble-free service.
- **RIGHT** . . . because there is a size and type to suit every kind of installation—eight sizes, 2 and 4 cylinders, 1/5 H.P. to 10 H.P. for "Freon-12" or Methyl Chloride.
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- **RIGHT** . . . because you protect your reputation . . . insure your customers' complete satisfaction.

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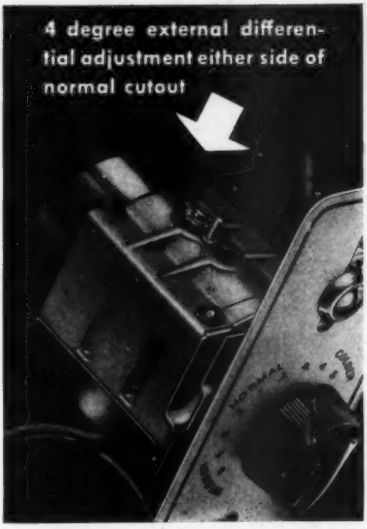
IN '42 THERE'S A JOB TO DO!



Cutler-Hammer Refrigeration Replacement Control with OUTSIDE DIFFERENTIAL ADJUSTMENT

- ✓ **Adjustable Mounting Brackets**
  Maximum Mounting Centers . . 4 3/16
  Minimum Mounting Centers . . 2 3/16
- ✓ **Adjustable Cutout Feature**—Differential can be increased 4 degrees by turning indicator in "Hi" direction and decreased 4 degrees by turning in "Lo" direction.
- ✓ **Adjustable Range**—Turning screw clockwise lowers settings and counter-clockwise raises settings.
- ✓ **Operating knob** can be adjusted to meet various evaporator scale settings. New knob is ideal for varying shield thicknesses. Makes *this* control adaptable to wider range of replacement jobs.
- ✓ Handles 90% of your Single-Button Replacement Needs.

NOW—AS NEVER BEFORE—*you cannot afford to miss* the All Industry Refrigeration and Air Conditioning Exhibition at Chicago. In '42, there's a job to do...for every man connected with the industry. There'll be more emphasis on repairs and replacement parts in 1942. More than ever *your* job will be to see that the installations that are now in, work right and keep on working. That is *your* job in the nation's all-out defense effort. Do your part. *And be prepared to do your part better*...by attending the 4th Annual All Industry Refrigeration and Air Conditioning Exhibition. The place is the Hotel Stevens in Chicago. The time is January 12 to 15, 1942. Make it a date. In '42, there's a job to do . . . for every one of us. CUTLER-HAMMER, Inc., 1363 St. Paul Avenue, Milwaukee, Wisconsin. *Associate:* Canadian Cutler-Hammer, Ltd., Toronto.

• • •

BE SURE to visit C-H Booths 513-515. 4th All Industry Refrigeration and Air Conditioning Exhibition, Chicago, January 12-15, 1942

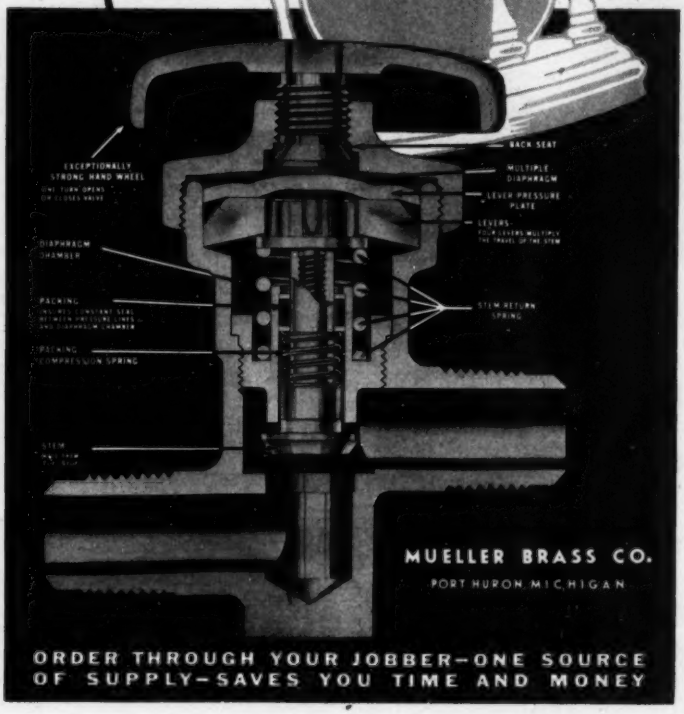
CUTLER-HAMMER
MOTOR CONTROL
C-H

Increased DIAPHRAGM LIFE PROLONGS THE SERVICE LIFE OF THE VALVE

● Because of the small amount of movement, the multiple diaphragm in our Triple Seal Valve is never deflected past its normal center, thus immeasurably prolonging both its life and the life of the valve in service.

This valve has positive sealing at three essential points—at back seat with valve in open position—the multiple diaphragms—and the superior packing around the stem. This packing assures constant seal between pressure lines and diaphragm chambers.

One turn only completely opens or closes the valve.



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ORDER THROUGH YOUR JOBBER—ONE SOURCE OF SUPPLY—SAVES YOU TIME AND MONEY

DEPEND ON PENN

In Your War on Waste

VISIT THE PENN EXHIBIT AT THE REFRIGERATION SHOW
(BOOTHS 210-212)
Stevens Hotel, Chicago, Ill.
January 12-15, 1942

THE BIG DRIVE is on against waste: waste of food, waste of equipment, waste of electric power—yes, and waste of your own time in slack periods.

"Big gun" of this great offensive is Penn's AVRGAIRE Control. In hundreds of above-freezing applications throughout the country this new control is protecting food, saving power, as it—

1. **Maintains ideal box temperature within 1° without erratic short-cycling of compressor.**
2. **Provides *selective defrost*—*automatic* when load is normal, *deferred* when load is heavy.**
3. **Prevents sliming and undue shrinkage of food, by accurate humidity control.**

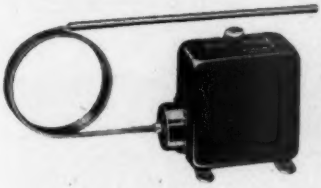
Installation of a Penn AVRGAIRE Control will increase the efficiency of above-freezing equipment, save money for the owner, and build valuable good will for you.

Penn AVRGAIRE Controls prevent waste of your own time because they give you profitable modernizing and service business during slack periods. They're quickly, easily installed.

Depend on Penn in your War on Waste. Get in touch today with your refrigeration supplies distributor.

Penn Electric Switch Co., Goshen, Ind.

AVRGAIRE • *Sensation of the Industry*



COLD ANTICIPATION is the key to AVRGAIRE'S remarkably close control of box temperatures. A revolutionary new idea in bulb application is the basis of this control which not only detects actual box temperature, but also senses the temperature trend. For walk-in coolers, reach-in coolers, display cases, florist boxes —all above-freezing applications.

PENN CONTROLS

LAGGARDS ARE TABOO!

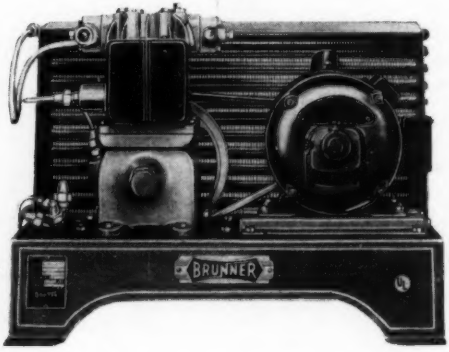
With defense going full blast, the great army of civilian workers and military men must be fed. Therefore, you, the refrigeration service engineer, must keep present equipment working efficiently. And second, you must install and recommend new equipment that provides dependable service for many years. For in defense, inefficient refrigeration equipment that lags on the job is taboo.

Brunner condensing units provide dependable refrigeration and protect foods from spoilage. Manufactured under rigid control, by experienced craftsmen on modern machines, Brunner units give users extra years of protection. Besides, their efficient, low cost operation helps to keep down overhead thus counterbalancing today's higher costs of business operation.

Brunner condensing units are available in air and water cooled models for ¼ to 25 tons of refrigeration. Write for fully illustrated catalog today. Brunner Manufacturing Co., Utica, N. Y., U. S. A.

BRUNNER

CONDENSING UNITS



BRUNNER MODEL A-33
⅓ h. p. air-cooled condensing unit, ideal for small display cases, cooling cabinets and boxes.

FAMOUS HENRY "FIRSTS"

1 The Packless Valve with Ports-in-Line and Balanced-Action, **2** The Wing Cap Valve with Steel Companion Flanges and Separable Brass or Steel Sleeves. **3** The Automatic Pressure Relief Valve with Push Rod for Emergency Re-seating. **4** The Permanent-Mold Iron Compressor Shut-off Valve. **5** The Distortion-Proof Flange for Dryers and Strainers. **6** The One-Piece Drawn Brass Shell for Dryers and Strainers. **7** The Welded Steel "Y" Strainer. **8** The Abso-Dry Pressure Sealed Dehydrator. **9** The Dispersion Tube for Dryers. **10** The Dehydratector—the Dryer with the Built-in Liquid Sight Port.

YOU CAN COUNT ON HENRY FOR MORE "FIRSTS" IN THE FUTURE!

HENRY VALVE CO.

1001-1019 NORTH SPAULDING AVENUE • CHICAGO

Thanks

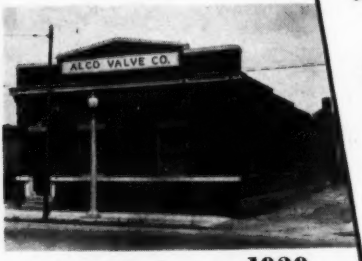
To the Refrigeration and Air Conditioning Industry

YOUR Acceptance of Alco Engineered Refrigerant Controls

For over sixteen years
Has made this growth possible

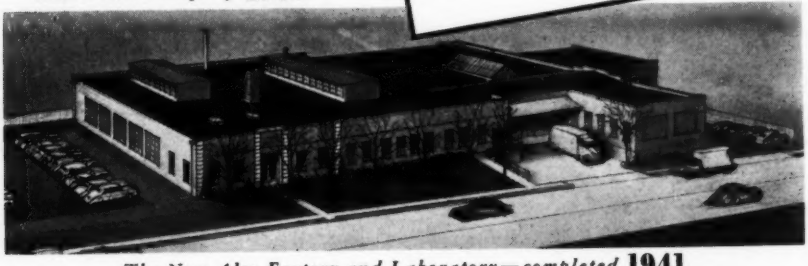
- ★ Multi-outlet Thermo Valves
- ★ Thermo Valves
- ★ Solenoid Valves
- ★ Evaporator Pressure Regulators
- ★ Float Valves
- ★ Filters

For All Refrigerants



Alco Valve Company **1929**

Alco Valve Company **1935**



The New Alco Factory and Laboratory—completed **1941**

ALCO VALVE CO.
2630 Big Bend Blvd. • St. Louis, Missouri
New York·Chicago·San Francisco·Los Angeles·Seattle

ALCO *Engineered Refrigerant Controls*
THE STANDARD OF THE INDUSTRY

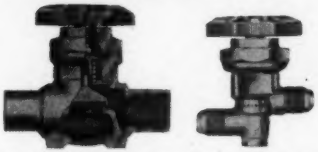
Superior PRODUCTS ★ ★ ★

★ ★ ★ FOR YOUR *Defense* JOBS

Increased refrigerated space for the accelerated production of perishable foods places a heavy responsibility upon the refrigeration industry. Shortage of metals condemns waste and inefficiency. Do your part to conserve materials. Design to produce more refrigeration per watt hour. Select equipment which requires a minimum of service. Specify SUPERIOR — the quality buy-word of the industry.

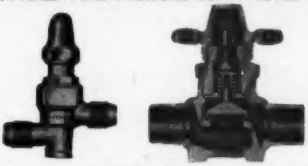
CUT

DIAPHRAGM PACKLESS VALVES



Entire internal assembly removable for soldering or inspection. Equipped with famous pressure cup below diaphragm. Two and three way. Flare sizes ¼" to ⅜"; Sweat sizes ¼" to ⅜".

PACKED AND PRESSURE CUP VALVES



Flare and sweat sizes ⅛" to ⅜" (two and three way) have hex seal cap. Sweat sizes ¼" to 2⅛" (globe) have wing nut seal cap. Internal assembly (all sizes) removable for sweating to valve body.

★ *Refrigeration is Vitally Essential to Our National Defense Efforts* ★

SAVE AND

CHECK VALVES

Very sensitive springs. Less than 5 ounces pressure drop. Positively will not chatter or hum. All internal parts easily removable for sweating or inspection. Sizes ¼" to ¾" Flare; ¼" to ⅜" Sweat.

LIQUID INDICATORS

With or without seal cap. Flare sizes ¼" to ⅜"; Sweat sizes ¼" to 1⅛". On ⅛" Sweat to 1⅜" entire upper assembly may be removed as a unit to facilitate soldering of refrigerant lines to connections.

★ *Refrigeration-Food Preservation and National Defense are Synonomous* ★

FOR FUTURE

DEHYDRATORS

Silica-Gel or Activated Alumina. Refillable and non-refillable. ¼" to ⅜"; ¼ to 5 H.P.; 2 to 60 cubic inches.

MANIFOLDS

With packless or seal cap valves. Two to six valves; ¼" to 2⅛" valves, with or without end fittings. Sweat or flare.

FILTERS

Highly efficient sock type filter. Sizes ¼" SAE to ⅜" SAE. One to five horsepower.

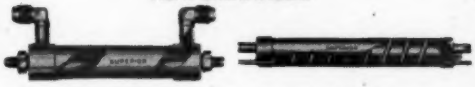
★ *Don't take chances with the Nation's Health -- do the best job possible* ★

REFERENCE

FITTINGS

Unions, adapters, elbows, tees, crosses, caps, etc. ⅛" through 1".

HEAT EXCHANGERS



Unique design gives highest capacity per unit size. Sweat or flare connections. 4200 to 9725 BTU per hour.

Combination Heat Exchanger and Accumulator. From one to ten tons. Especially recommended for low temperature installations.

FLARE NUTS

Brass and steel. Long and frost proof. Forged and bar stock.

For complete details — see your Jobber or write for catalog

★ We invite you to visit the SUPERIOR EXHIBIT — Booth 514 at the 4th ALL INDUSTRY REFRIGERATION and AIR CONDITIONING EXHIBITION – Hotel Stevens – Chicago – January 12 to 15, 1942 ★

SUPERIOR VALVE & FITTINGS CO.

★ PITTSBURGH ★ PENNSYLVANIA ★

We'll meet you in

CHICAGO

at

The STEVENS HOTEL

JANUARY 12, 13, 14, 15

• Ranco will be there in full force—at the All-Industry Refrigeration and Air Conditioning Exhibition.

You'll find our headquarters at Booth No. 2—and you can be sure of a hearty welcome from the entire "Ranco crew." Arrange to meet your friends at the Ranco booth. We'll be looking for you.

Ranco INC., COLUMBUS, OHIO, U S A

The Refrigeration Service Engineer

Vol. 9 No. 12

December, 1941

A Monthly Illustrated Journal Devoted to the Interests of the Refrigeration Service Engineer in the Servicing of Domestic and Small Commercial Refrigeration Systems and Oil Burners

Official Organ
REFRIGERATION SERVICE ENGINEERS SOCIETY

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MANPOWER AND MATERIALS
KEYS TO NATIONAL DEFENSE
-they must be conserved

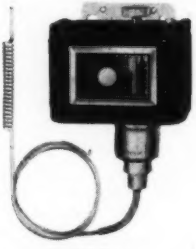
Defense requirements must come first. Demands are heavy—will be heavier—and they must be met. Hence, it is a patriotic duty to conserve manpower and materials—the twin keys to National Defense.

In laying out refrigeration and air conditioning installations, it is necessary to consider these factors. As the army grows—capable service men will be fewer—the answer is equipment that requires minimum service. If equipment is ineffective and has to be replaced, added and unnecessary loads are thrown on production machines needed for turning out military supplies. Additional materials must be used which may be needed elsewhere. Select equipment that won't have to be replaced.

Detroit Refrigeration Valves and Controls have proved their dependability, effectiveness and durability. They make the least possible demands in service and replacements.

No. 673
Thermostatic
Expansion Valve

No. 683-3
Solenoid Valve



No. 450 ZL-1
Temperature Control

DETROIT LUBRICATOR COMPANY

General Offices: DETROIT, MICHIGAN

Canadian Representatives—RAILWAY AND ENGINEERING SPECIALTIES LIMITED, Montreal, Toronto, Winnipeg

The Refrigeration Service Engineer

Vol. 9, No. 12 CHICAGO, DECEMBER, 1941 $2.00 Per Annum

Heads Up, America!

SUNDAY, December 7, will go down in the annals of history as a sad day—yes, a very sad day for the Japanese militaristic regime responsible for the unprovoked attack on our country. Many times in the future Japan will be reminded of her ill advised move and her once ambitious hope of being a "big" world power will only be a memory—and not a very pleasant one at that.

Maybe we didn't understand the reasoning of the mystical Nipponese mind, but with the declaration of war by our country, it didn't take long for us to dissect the pattern and take immediate steps to assure forever that this peril to peaceful nations will not occur again.

It is now "all out defense" with a unified America rolling up its sleeves to see that the business in hand is dispatched with neatness and decision.

We, who must see to it that America's perishable food supply is protected for our armed forces as well as the civilian population, will see to it that every ounce of energy is employed in seeing that our contribution to national defense is made productive.

There is work to be done—we must do more with less—but we have successfully met such emergencies before. Refrigeration equipment for keeping America's perishable food supply will be maintained at peak performance. You can count on us, Uncle Sam, to help keep America strong and healthy. We shall do our part with the avowed spirit that with a unified nation we shall insure the "American way of life." *Heads up, America!*

The Army Says!—

"Proper Preservation of Food Is a Vital Factor in Maintaining Health and Morale of Officers and Men"

Practically No Food Spoilage in the Army

Indicating that the Quartermaster General's Department knows only too well that refrigeration is essential not only in the maintenance of army health, but the civilian population as well, this article issued by the Office of the Quartermaster General, Washington, D. C., is published in full.—Editor.

"NO food spoilage in our Mess" is the slogan of Army Mess Sergeants in all Corps Areas. And rightly so. The proper preservation of food is a vital factor in maintaining the health and morale of officers and men.

Mrs. Average Housewife, whose problem, in keeping food fresh and healthy for her own family, is essentially the same as Uncle Sam's, would no doubt relish a glimpse at some of the refrigeration facilities installed for the Army by the Quartermaster Corps in the various posts, camps, and stations.

In such case she would find, first of all, that the Army's "Mess Hall Refrigerator" with a capacity of 65 cubic feet, is about ten times as large as her own ice box, which has a capacity of about six cubic feet.

There are two of these giant refrigerators in most Army kitchens so it's safe to say that the soldiers' mess hall has ice box facilities about twenty times as large as the average American family.

Enormous as these mess ice boxes are, they're "jeeps" compared to the storage refrigerators utilized by the Army camps for preservation of perishable material on a large scale. Some of the latter can hold enough meat, butter, eggs, fruits and vegetables to feed fifteen thousand men for ten days to two weeks.

Recently a Quartermaster statistician peeped into one of these super-ice boxes and noted its contents: 50 tons of meat, 6 tons of butter, 8,000 dozen eggs, and 25 tons of fresh fruits and vegetables, among other items. But to return for the moment to the mess hall refrigerator—the MHR, as the mess sergeants call it—is very much like the ice boxes used by the average housewife; except that in the first place it is *not* generally provided with separate compartments for meats, vegetables, eggs, milk and so on; and in the second place it *is* provided with a continuous air movement that serves to keep the temperature uniform in all parts of the box. The refrigerator unit itself is usually located in the center of the box.

Unlike the home refrigerator, the Army ice box isn't usually equipped with facilities for manufacturing ice. Most ice for iced tea, coffee, and other beverages is purchased either from commercial manufacturers, or from a central ice manufacturing plant located in the camp.

Whereas most housewives are proud of an ice box filled almost to overflowing, the Army refrigerator rooms are usually packed only to about 40% capacity. There's a very good reason for this. There must be ample space to allow for thorough circulation of air in order to get uniform temperatures throughout the storage box.

There are thousands of mess hall refrigerators in the Nine Corps Areas. Practically all the big camps have them, and they are filled with just about the same kinds of food delicacies as may be found in the average household refrigerator. There are puddings, hashes, creamed foods of all types, left-over from previous meals and cooked meats of various types. In fact, it is safe to say that almost everything for im-

mediate consumption in the mess hall is kept in the average mess refrigerator.

From all this it should be obvious to the average housewife that the general function of the Army mess refrigerators is about the same as that of the one in her kitchen. However, faced with the task of feeding some 1,600,000 hungry soldiers, Uncle Sam finds that the general turnover in the Army ice box is usually much more rapid than is the case at home. Practically all Army camps try to keep only a day's supply of perishables in the mess refrigerators. Larger quantities customarily are kept in the cold storage warehouses, where they are available at a moment's notice.

Whither Are We Bound

Crystal gazing, like horse racing, is not a sure bet. But Mr. Alter, who knows his refrigeration, presents some sound reasoning for the hopeful future of the service business. It's an optimistic outlook, but one must have vision and initiative if he is going to fully benefit.

By HARRY ALTER*

I HAVE been asked to discuss the future of refrigeration service. Such a discussion involves both the use of a crystal ball as well as an explanation of what the word "future" means.

To start with, the future is any time beginning with tomorrow and each day thereafter into infinity. So for the purposes of this discussion consider the future in these stages:

The immediate future—that is, during the present emergency, no matter whether it is for one, two, or three years. Let us all hope that within a much shorter time we will see peace and freedom restored to this earth.

Then *the near future* which we will describe as a one- to three-year stabilization period after a victorious peace has been established. Neither I nor any man is capable of talking of the future in the event of an Axis victory.

And finally, *the distant future,* which let us think of as the 10 years following the stabilization period. Thus you see I am going to peer into my crystal ball and attempt to forecast events in this refrigeration business covering about a 15-year stretch of time. Such an endeavor is not as hopeless as it seems if one draws on experience, studies the trends and watches all road signs along the way.

So after a long look at my crystal ball let us see what the immediate future has in store for us. During the present emergency what has taken place during the past six months will continue. Scarce metals and materials will remain scarce. Their use will be limited to essential defense and civilian needs. The government has already indicated its policy which is far-reaching as far as refrigeration service is concerned, namely, the policy of repairing and maintaining existing equipment. Certainly it is good horsesense to do so, and particularly in view of the need of curtailing new production of many different kinds of equipment, in order to conserve scarce material.

The Office of Production Management in Washington has already decreed in their Order No. P22 that in practically all business and public institutions except retail stores and private residences, any scarce material can be obtained for repair and maintenance under a preference rating of A10.

I venture the prediction that in both retail store and private homes Order No. P22 will be extended so that material for their repair and maintenance will also come under an A10 rating and this within the next four months. Accordingly, during the emergency it is my considered judgment that we in the refrigeration service and repair business will suffer no undue hardships due to too severe

* President, Harry Alter Co., Chicago, presented before a meeting of the R.S.E.S. Chicago chapter.

restrictions on the materials we require. In that respect we are indeed fortunate.

Certainly any one will admit that with next year's cut in production of both commercial and domestic refrigeration, with the fewer units available to the public as a result of such curtailment, more and more of the refrigeration equipment now in operation must be adequately serviced. In other words, we can clearly see more and more repair work in refrigeration coming up during this period. With adequate supplies of repair material available and plenty of service work certain to come up each day, there is a third factor that comes to my notice—and that is fewer repair men in the field to do the work. Many of the younger men, previously doing service work, have entered the Army or Navy. Others have accepted jobs in defense industries. Very definitely, particularly among the fringe type and part time worker, there is a large reduction in the number of men in the refrigeration service field.

The Course to Follow

That brings me to a very logical conclusion as a definite course to follow for those remaining in the field—namely, *get the full price for your work*—don't sacrifice your just profits. During that period during the depression that five men were after one repair job, price cutting could hardly be avoided—but there is no excuse for it now. Neither do I suggest that undue profiteering is a good thing—on the contrary unreasonable service charge can be just as disastrous as price cutting. What I do suggest is that charges for service work should be based on cost of material, labor, overhead, plus a reasonable percentage of profit. To take too little profit is foolish—and to ask for too much is equally foolish.

One unfortunate effect of present and near future conditions is the strong trend towards advancing prices. It seems to me that increased costs of all goods now presents the greatest hazards that we face commercially. What goes up must come down and, saddest of all, any artificially increased profit we get today, resulting from increased valuation of inventories, means higher taxes. Higher taxes are paid in cash but such profits are represented only in larger inventories. Yet on the down cycle, with falling prices, inventory losses are real cash or current losses for which we can provide no reserve or cushion. On the whole my view of the immediate future is so highly optimistic that I could be accused of having a crystal ball with a very decided rosy hue.

Now let's look at the period when and if the world comes to its senses, peace restored and reconstruction of the war torn world is started. Looking back to the last war, November 11, 1918, found this country in as full production on armaments as at present with more men under arms, and civilian commerce tremendously curtailed. After the Armistice there was a general feeling of uncertainty—how could this gigantic war effort be stopped? How could these millions of men be restored to civilian pursuits? These mammoth factories and inventories be liquidated without complete ruination of private business? All such fears proved groundless and the one big lesson learned then and to be remembered now is that the millions of men released from our Army and Navy were *consumers*—consumers who wanted things, consumers possessing a pent-up buying power so vast that a wild inflationary boom resulted. A runaway boom that burst in 1921 about two years after the Armistice. Such wild price fluctuations prevailing then seem now to be something ruled out with Congress about to pass its price control measure.

When the War Is Over

So, when this present conflict is settled and another Armistice is declared, production of armaments, shells, tanks, guns, and ships will cease. And instead, America will convert its factories back to the production of automobiles, refrigerators, radios, washing machines, and all the other things that Americans will not do without. So also will armies and navies decrease in size and so also will these boys returning home prove to be as great consumers as the boys of 1918. Plus this also—during the emergency civilian buying and civilian production has been and is being severely curtailed—just one more long year of present day "doing without" and when peace arrives there will be released in this country and the world the greatest demand for goods in history of business. Don't overlook either that the money for this stampede of buying is laying in huge savings deposits and enormous and increasing social security deposits.

Now so far, we have gone through the emergency period and the near future when peace arrives, without any signs of trouble for the refrigeration service business, so let's take a look at the "long pull." After peace and after a short stabilization period, what then? Will old equipment be junked and replaced with new? Will new refrigeration machinery be so perfect that repairs are unnecessary? Will distribution schemes be such that independent service organizations are left out in the cold? I say "no" to all these questions.

Repair Hermetics

Of course new refrigerators, commercial jobs of all types and air conditioning units, will be sold in enormous quantities—but little old equipment will be junked if it is economically repairable. Of course we'll see new types of hermetic units that "must go back to the factory" for repair "according to the factory" but with the buying public there is no *must*. If a hermetic unit can be repaired in the neighborhood, *and it can be*, that's exactly where it will be done. What I am saying is that hermetics can be repaired in your shop—all you need is a modest amount of equipment. The start, of course, will come from a growing public demand. Because of the fact that most hermetics now in use have been sold with five-year and in some cases 10-year warranties the demand for such repair has been small. However, commencing with 1942 and every year thereafter, the warranties on about two million hermetic units will expire. As trouble develops with these five-year-old jobs, there will be a substantial amount of hermetic service. Then it will be just a question of who gets the repair work. Sending both the low and high side of a hermetic job back to the factory is not economically sound—the transportation charges can be in some cases as costly as the repair charge itself. That's why on some makes as much as $64.50 is charged for replacing a hermetic unit. My guess is that with proper and simple equipment the job could be done in an independent shop for one-half that amount. So, as resistance develops on the public's part for such exorbitant charges, there will be created the demand for reasonable repair charges that can only come from service work done in the community. And with such a demand the industry will find means of securing adequate equipment, replacement parts, refrigerants, and repair procedures.

Consequently, as I see it, the service business will enlarge as the industry enlarges. Where and when that growth will end no one can say. I think some day every single purveyor and preparer of food, drink and ice cream, both wholesale and retail will have mechanical refrigeration. I think some day every good restaurant, every good grocer, and many of our homes will have frozen food storage boxes. Some day air-conditioning will really come into its own. Automatic cold drink vending machines equipped with refrigeration will be in every available location.

With such a vast potential market for millions of different kinds of refrigeration equipment, my suggestion to those in the service and repair business is to get sales-minded. The technically trained service man can do a good sales job in selling many of these highly specialized products—better than untrained non-technical men.

Frozen Food Field

This will be particularly true in the frozen food field—and my confidence in the growth of this industry is unbounded. It is something we should all watch, study and keep up with.

With efficient low cost distribution of frozen foods who can say but that in a few years all of us will be eating nothing but frozen meats, fish, vegetables and fruits.

Properly processed their quality is superior. Hotels and restaurants will be serving out-of-season fruits and vegetables all year round. They can carry an enormous inventory without deterioration and avoid the waste common to fresh products caused by a daily variable demand. Likewise a large inventory of frozen meats and fish will provide a choice supply instantaneously available to the chef for a sudden large demand also without waste. With larger use frozen foods will be lower in price. In a few years my prediction is that most hotels and restaurants will be equipped with low temperature cabinets for the storage of frozen foods that they will serve their guests exclusively.

And with such a wide-spread educational use in public eating places, our homes will be equipped with low temperature storage cabinets, where we can store larger quan-

lities of frozen fish, meats, fruits and vegetables for unexpected guests, for better foods, and year round catering to our tastes for many otherwise rare delicacies. I believe the industry will sell millions of small and large low temperature storage boxes during the next few years.

Each one becomes a potential source of revenue to the expert refrigeration serviceman—and if he is sales-minded he can also share in the profit of the original sale.

In conclusion, if this sounds too optmistic, if some of us think that the good old U.S.A. is going to the dogs, read the following from *Dun's Review* — one of the most effective things I have ever read.

As Others See Us

During recent years we have been hearing a good deal in this country about the "failure" of our economic system. We have been told that it has not eliminated unemployment, that it has been unable to control the alternating cycles of prosperity and depression, that it is not distributing the products of commerce and industry among the masses, that it has not abolished poverty. These and other shortcomings of the system have been emphasized over and over again until there is danger of forgetting, in the eagerness for perfection, the truly amazing positive achievements of the system.

It is good, therefore, to see ourselves occasionally as others see us.

Last Summer a distinguished Argentine statesman, Dr. Federico Pinedo, devoted three and a half months to one of the most comprehensive trips over this country ever made by a prominent Latin-American. Dr. Pinedo holds an outstanding position in the business and political life of his country. He is a leading member of the legal profession. He has served in the Argentine House of Deputies and has twice been Minister of Finance. During his incumbency as Minister he took a leading part in establishing the Central Bank, in consolidating the banking system and in creating a unified tax system out of the maze of taxes that had grown up over many years. Highly honored at home, he enjoys also a wide prestige throughout South America.

His visit last Summer was his first to the United States, and was with the purpose of making a first-hand study of social and economic conditions. He traveled in all parts of this country—north, south, east and west—and visited our cities, our manufacturing plants, our mining towns, our ranches and our farms.

On his return to his native country in September, Dr. Pinedo gave an extensive interview to La Nacion, one of the leading newspapers of the Argentine. In this interview he reviewed broadly his impressions gained during his trip, indicating the significance to Argentina of what he had seen and heard, and urging in the friendliest manner the establishment of closer relations between the two countries. Dr. Pinedo was speaking to Argentinians for Argentina; yet what he had to say about the United States is so striking a tribute to the accomplishments of our system of democracy and private enterprise that we feel it should be given wider circulation in this country. Coming from so high a source, and at a time of doubt when many of our institutions are under attack, his statement gives a much needed and heartening perspective on ourselves. It would be well if his words could be read by everyone, and especially by those who in impatience and discouragement would drastically alter our system or abandon it for some other.

A free translation of some of the pertinent parts of Dr. Pinedo's comments follows:

DR. PINEDO'S STATEMENT

In my visit of 3½ months to the United States, I really just began to cover the index pages of a book which is really magnificent.

My trip was made by automobile over marvelous roads which in themselves are an example of what the United States is. I traveled some 30,000 kilometers from Florida up the Atlantic Coast, through the states which were members of the original 13 colonies on to Canada, then through the large industrial region in the neighborhood of the Great Lakes, and on out through the rich agricultural district, with visits at various mines, to the immense forests on the Western Coast. We then came down through the garden of California and returned through the states in the Southwest, over to the Gulf of Mexico, and back to Florida. Everywhere there is evidence of the economic strength, the richness and the exemplary push of the Americans, and there is nothing like it in any other country of the world.

Neither New York City with all its splendor and wealth, the cotton and tobacco regions of the South, the enormous grain growing district of the Middle West, the huge cattle ranches of Montana and Texas, the forests of Oregon and Washington, the huge industrial region of the Great Lakes or the garden valley of California represent individually the United States. Instead one must take all of them together and thus realize that that country is the largest agricultural nation in the world, that it is the most advanced industrially, and that in addition it has huge mineral sources which are being adequately exploited.

While it is true that Nature has been very kind to the United States in immense natural resources, the drive, the audacity and tenacity of the Americans had made excellent use of everything that Nature gave them; they have exploited all of their natural resources, whereas in other countries similar resources have not been exploited or have only been partially exploited.

DISTRIBUTION OF WEALTH

Furthermore, the political and social structure of the country has resulted in those resources having been utilized to bring about the well-being of an enormous number of people. Although the United States has its multi-millionaires and at the same time undoubtedly has many people who do not have all the necessities of life, there is no place in the world where material wealth is so adequately subdivided. By this I mean to say that in the United States there are millions of people who have so many material comforts. In no other part of the world do workmen, employees and small farmers have automobiles, telephones, radios, electric refrigerators, electric washing machines and thousands of other modern conveniences.

It should be kept in mind that of the 36,000,000 automobiles in use in the world 30,000,000 are in the United States; that each year 4/5,000,000 new automobiles are sold in the United States; that each day

Production Needs Health

several thousand electric ice boxes are sold in the United States; that each day as much agricultural machinery is sold to the American farmers as the Argentine farmers buy in one whole year; that even though the population of the United States represents only 7 per cent of the world population, 70 per cent of the life insurance of the world is written in that country. I cite all of these things to show the extraordinary advantages which are enjoyed by the masses of the population of the United States, and in order to demonstrate the way that the wealth of that country has penetrated down through practically all classes of the population . . .

STANDARD OF LIVING

The immense superiority of the people of the United States from a material point of view as compared with the people of any other country in the world is readily shown in the way that they dress, the homes, the market places, the stores, the hotels and the places where they enjoy their hours of rest —more hours being available because of the way that they have organized their working time. The cleanliness that is evidenced everywhere, the excellent lighting facilities everywhere, the excellent drinking water, and the huge hospitals give an idea of the excellent hygienic conditions under which the people live. Public schools and graduate schools are located everywhere and always in excellent modern buildings. There are innumerable universities, many of which carry on scientific investigations, and many are backed by huge endowments voluntarily contributed by private individuals. In addition libraries, observatories, art museums, and scientific museums bring to one's attention in all parts of the country the real preoccupation of the national Government. the individual States, the municipalities, and all of the people in the country to improve their cultural advantages . . .

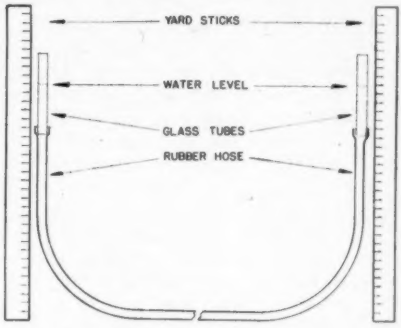
The American cities collectively and individually represent the comfort and progress of the American people through the monumental private and public buildings, the numerous and beautiful parks, the beautiful city and suburban residences and even homes for the employees and laborers with lawns, gardens, electric light, good water, sunlight and air. Please bear in mind that the above is not seen in only certain parts of the United States; it is seen everywhere . . .

U. S. VS. OTHER ECONOMIC SYSTEMS

All of the above is mentioned in order to show that the people of the United States merit the political and social structure which they have created in order to reach their degree of civilization. When other forms of government may be able to exhibit such results from a material and cultural point of view and down through the different classes of the people; when other forms of government may be able to create among their people that sentiment of dignity; when they may be able to prove that they can maintain order in some form that has not involved complete submission of the masses; when they have been able to create unlimited cultural advantages for everyone through schools and universities in all parts of the country; when they have been able to give their people a sense of security as regards their rights and liberties instead of utilizing terror and robbery; then and then only should we even think of orienting ourselves on the basis of what is happening in some country other than the United States.

LEVELING DEVICE

OCCASIONALLY we are in need of some means of determining the relative level of two points too far apart for the ordinary spirit level, or between points having some obstruction between them which will not permit the use of any leveling device laid in a straight line between the points.



The leveling device shown here uses the principle of the "U" tube in which water seeks its own level. The equipment consists of two glass tubes, a length of small rubber tubing, and two yardsticks. The glass tubes are marked an equal distance from one end and inserted in the ends of the rubber tubing as shown in Fig. 1. The mark on the glass will become the water level mark from which point the slope or incline can be measured.

The yard sticks are for the purpose of measuring the distance from the water level to the object being leveled. The device can be used equally as well on the ceiling as on any floor surface. It is particularly useful in finding the relative level of two points on each side of a wall.

* * *

William Hoope,
Pennsylvania.

You should change the name of your magazine to "The Serviceman's Friend," well worth the name.

Wayne Harrington,
Oregon.

THE REFRIGERATION SERVICE ENGINEER is a fine magazine.

Defense Needs Refrigeration

An Army Travels on Its Stomach

By EDWIN A. KINGSLEY*

In this war of machines the army behind the army is equally as important. It too travels on its stomach. Maximum production cannot be attained without the health and strength gained through adequate supplies of fresh foods. Shifting populations to armament centers need new refrigerating equipment.—Editor.

"AN Army travels on its stomach"—Napoleon is said to have used this expression in describing some of his campaigns. How true this statement is, none knows better than those who participated in World War No. 1, and who were responsible for the great task of supply food and equipment for the army.

Modern war with its blitzkreig tactics has not eased the burdens of those who feed the armies. Modern equipment has, however, kept pace with the advance, and experience has shown that during the military maneuvers in the South the American soldier is the best fed soldier in the world.

When the United States entered the first World War, few, if any, realized the tremendous organization which it would be necessary to create for the service of supply—that is, provisioning and equipping an army both in this country and abroad.

One of the most important items in the American soldier's diet is fresh beef. This item, besides being an important one, is one of the most difficult to deliver to the consumer in prime condition since it must be stored and transported at low temperatures.

When our soldiers reached France, the staff was appalled to find such a dearth of refrigerated storage facilities. There was available for the use of our forces storage capacity for considerably less than 1,000 tons of beef—probably 750 tons would be more nearly the correct amount. The general staff cabled for materials and personnel for construction and operation, since at that time there was no refrigeration department in the army.

Competent engineers were obtained from such firms as Swift, Armour, Morris, and others, who were large users of refrigeration and who were familiar with the type of construction and the machinery necessary for providing refrigerated storage for perishable foods.,

When the Armistice was signed, 120,000 cattle would have been required to fill all of the refrigerated storage plants built and operated by the A.E.F. These plants were constructed under the supervision of the Engineer Corps by construction and erection forces sent over by the Construction Division. Partly because such equipment was available, and partly because it was felt that more operating men were familiar with simpler designs, horizontal tubular boilers of moderate working pressures and Corlis engines, connected to slow speed ammonia compressors, were used. Today these are outmoded by newer designs and more efficient equipment with which you are doubtless familiar.

Refrigeration a Necessity

Refrigeration and the use of ice has long ago jumped from the luxury class to well up on the list of absolute necessities.

Every other day it seems someone invents a new process for creating a cold spot in the sea of heat in which men live. New processes are being continually developed, but thus far we have had to be content with just one—the evaporation of a liquid. Even the animals use this principal, since they cool themselves by this method on warm days.

Freezer storage at port of embarkation is another link in the chain of cold storage facilities which must reach from the packing house to the most distant army division.

Normally, meat arrives at the domestic station in refrigerator cars. Where the tem-

* Zone Principal Mechanical Engineer for Col M. A. McFadden, zone constructing Quartermaster—Zone II. Delivered before the R.S.E.S. New York State Association.

peratures have risen, the meat is re-frozen before being transferred to shipping having refrigerated spaces. Where railroad facilities are available, refrigerator cars are used as far as railheads, and from there the refrigerator truck is used.

Cold storage facilities for handling perishable food supplies are taken care of at army camps in standard mobilization cold storage buildings.

A standard building is laid out to provide for a railroad siding for receiving supplies, and a platform for issuing on the opposite side of the building. The building is insulated with six inches of insulating material on sides and floors (except meat storage room which has eight inch insulation on walls) while ceilings have six inches under roof slab, and two inches over roof slab. Tar and gravel roofing is specified. While corkboard of mineral wools have been the materials used for protection of these buildings, other insulating materials, such as fibre glass, are replacing cork where scarcity exists.

Layout of Building

The building, approximately 72 ft. x 90 ft., is divided into a number of rooms—transformer room, machinery room, one large meat storage room, one large and one small dairy and vegetable products room, an issue room, and an office. Provision is made for an ante-room in which is a scale for weighing in. The track hangers are continuous, following through to the meat storage space and continuing to the general issue storage where the scales for weighing out the products to be delivered to the buildings for current use.

The machinery room is designed for three compressors with motors, each unit to be connected to its evaporative condenser. Two of the compressor units are to take care of the meat storage room cooling, and are each required to have a refrigerating capacity of 160,000 B.t.u. per hour. The third unit is for the purpose of refrigerating the two dairy and vegetable products room in the general issue room; its capacity is rated at 268,000 B.t.u. per hour. The Freon condenser temperature is figured at 100° F. in the case of the first two units and 105° F. in the latter—the suction temperature 10° F. and 15° F., respectively.

Meat storage rooms are to be held at a temperature not over 10° F., and other rooms not over 35° F. The evaporative condensers for the two smaller units are to take care of the refrigerant from the smaller compressors, with allowance for compressor motor heat, and to operate at approximately 4000 c.f.m., with outside air at 80° F. wet bulb, and the larger unit is to circulate 6000 c.f.m. under the same air conditions. The compressors are furnished with either variable capacity reducers, to give 100%, 75%, or 50% rating, or to be supplied with variable speed motors for obtaining the same performance. Condensing coils are of such design that sprays are to be used in summer and to be shut off in winter, if found desirable.

Lowside Equipment

The meat storage room has four unit coolers, each 75,000 B t u. per hour; large dairy and vegetable products room with two coolers, each approximately 59,000 B.t.u. per hour; small room, one unit cooler of 22,000 B.t.u. per hour capacity; and issue room, two unit coolers each of 59,000 B.t.u. per hour capacity. Unit coolers are all controlled by thermostats and the four units in meat storage room are equipped with defrosters.

The entire plant is automatic, the operation of engine room being provided with suction pressure control valves.

All compressor units are equipped with high pressure safety cutouts, and evaporative condensers operate automatically with their respective compressor units.

The cold storage plant is designed to handle food supply for a definite number of men. Additional plants are added if necessary for larger forces. These plants act as main storage and are constantly delivering supplies to other buildings where facilities are available for immediate food supplies.

From these cold storage plants, foods are delivered to mess buildings. At such a building as a 1000-man mess, provision is made for storing perishables. Refrigerated rooms for meats, dairy and vegetable products are included in such buildings. A small compressor with motor, condenser, etc., of the unit type, is installed with full automatic controls to keep temperatures at desired points. Smaller mess buildings use the portable type of automatic refrigerator. A re-

cent program designed to mechanize all refrigerators in the various camps and army posts involved the purchase of 12,000 conversion units, each designed to convert an ordinary ice box, using commercial ice, to a mechanical refrigerator. This is in addition to mechanical refrigeration already in use.

Refrigerated Trucks Planned

Plans are now under way to establish a standard refrigerated truck for troops on the move—a truck designed with a refrigerating plant built into the front of the body which would freeze a eutectic solution in plates. Operation of the refrigerating unit would be by a gasoline engine, and the use of an eutectic would permit a period of, say, six to eight hours during which time the food space would be kept cool if it were necessary to do any repair work on the compressor unit or any of its auxiliary equipment. Such a period of time would allow repairs to be completed or food supplies could be moved to another truck, and thus bring losses of perishables to a minimum. If equipment of the type as described proves satisfactory, some standard for troops in the field will be a reality in the near future.

In order to meet the demands of the program with which it was faced during 1940, the Construction Division of the Quartermaster Corps had to be reorganized to handle a volume of business seventy times greater than its normal load.

The bringing together of the trained personnel to carry out this large undertaking of the Constructing Quartermaster was accomplished quickly in spite of the nationwide demand for trained executives and employees of all kinds. As a further step toward speed and economy, the country was divided into nine zones, corresponding with the boundaries of the nine corps areas of the army. In each of these zones a highly competent army officer has been placed in charge and provided with a staff of engineers, architects, construction experts and real estate advisers who are acknowledged leaders in their respective professions.

Establishment of the nine construction zones was effected for the purpose of facilitating supervision of construction in the field being performed by Constructing Quartermasters, and to expedite the building program. In all matters pertaining to construction activities unde the Quartermaster General, the Zone Constructing Quartermasters are under the exclusive control of the Quartermaster General, although subject to the jurisdiction of the Corps Area Commanders in matters of discipline, police and sanitation.

That there might be no misunderstanding in regard to the policy of the control of the construction projects, a clear interpretation of the regulations governing activities was issued by the War Department in January 1941.

In this exposition of policy, it was stated that present regulations provide that construction projects, including fortifications before they are turned over for use of the army in the continental limits of the United States, are exempt from corps area control, and thus come under direct control of the War Department Construction Agency. Also that constructing quartermasters and contractors, and their respective employees, while engaged in construction work ordered by the War Department, are under the exclusive control of the Quartermaster General in all matters pertaining to such construction work unless otherwise directed by order of the Secretary of War.

It is the policy of the War Department, whenever possible, to conform to the views of local commanders with regard to new construction. In pursuance of this policy, the recommendations of corps area commanders are sought and approved when feasible. In so doing, it is not intended to delegate authority to the corps area commanders to control construction projects which are being accomplished by the Quartermaster General.

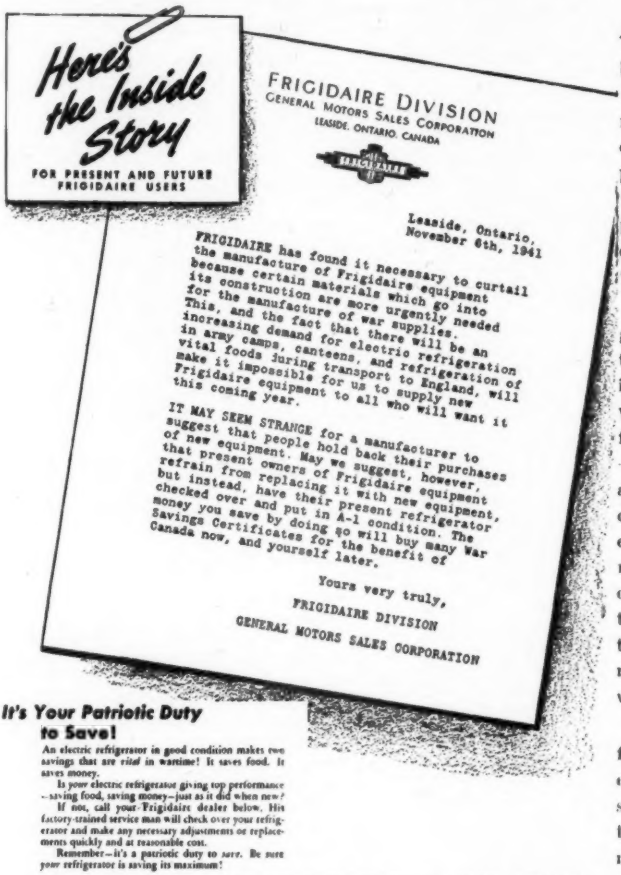
Service Setup

How are each of these plants serviced? Each of the Army posts has a Utility Officer—many of whom are reserve officers who have been utility men in private life. These men are conducting schools at the various posts and are rapidly training their men to take care of all utilities, including refrigeration. Men, experienced in such work, are conducting these schools. Many are civilians in government employ.

In such a short time, it is impossible to more than touch on the gigantic task which is being undertaken and which is now in

progress, covering the construction work going on at all the army camps and posts throughout the country and which is being accomplished by the Construction Division of the Quartermaster Corps. Only a part of the refrigeration work, which is so vital a part of this defense program, has been covered—and refrigeration is only one of the items which this Division is handling. But "Time Is Short" and "Keep 'Em Flying," which are typical posters seen in the offices of this branch of the Service, point to the fact that we must prepare—and rapidly—and for what? For maintaining the high standards and the freedoms the good old U. S. A. stands for.

Newspaper Ad Emphasizes Repair


Here's the Inside Story
FOR PRESENT AND FUTURE FRIGIDAIRE USERS
FRIGIDAIRE DIVISION
GENERAL MOTORS SALES CORPORATION
LEASIDE, ONTARIO, CANADA
Leaside, Ontario,
November 6th, 1941
FRIGIDAIRE has found it necessary to curtail the manufacture of Frigidaire equipment because certain materials which go into its construction are more urgently needed for the manufacture of war supplies. This, and the fact that there will be an increasing demand for electric refrigeration in army camps, canteens, and refrigeration of vital foods during transport to England, will make it impossible for us to supply new Frigidaire equipment to all who will want it this coming year.
IT MAY SEEM STRANGE for a manufacturer to suggest that people hold back their purchases of new equipment. May we suggest, however, that present owners of Frigidaire equipment refrain from replacing it with new equipment, but instead, have their present refrigerator checked over and put in A-1 condition. The money you save by doing so will buy many War Savings Certificates for the benefit of Canada now, and yourself later.
Yours very truly,
FRIGIDAIRE DIVISION
GENERAL MOTORS SALES CORPORATION
It's Your Patriotic Duty to Save!
An electric refrigerator in good condition makes two savings that are vital in wartime! It saves food. It saves money.
Is your electric refrigerator giving top performance—saving food, saving money—just as it did when new?
If not, call your Frigidaire dealer below. His factory-trained service man will check over your refrigerator and make any necessary adjustments or replacements quickly and at reasonable cost.
Remember—it's a patriotic duty to save. Be sure your refrigerator is saving its maximum!
FRIGIDAIRE DIVISION — General Motors Sales Corporation — LEASIDE, ONTARIO

A SERIES of newspaper ads, by Frigidaire of Canada (one of which is reproduced) points out the necessity for proper maintenance of existing equipment, particularly in view of restricted production.

"An electric refrigerator in good condition makes two savings that are vital in wartime. It saves food. It saves money!" —is the theme of the ad and points out clearly why it is necessary to keep a good refrigerator in proper operation to relieve the current production of such equipment for essential wartime purposes.

Several other manufacturers have adopted a similar policy in suggesting that a call to the service man now will save inconvenience later.

Steel Tube for Refrigeration

Out of every war we have fought have come new materials, new methods of production and new ideas. Forced on us by the necessity of relieving the strain on regular supplies the new products have often proved better, so that they came to stay. Steel tubing might well be one of these products, relieving the demand on copper.—Editor.

By A. Di Giulio *

THE shortage of metals and alloys, resulting from the great demand created by the national emergency, has unquestionably made problems both for the producer and for the user of materials.

The refrigeration industry is facing the problem of finding other alloys to replace those commonly used. It seems to the writer that, in spite of the fact that the problem of replacement demands a quick solution, now is the time to thoroughly investigate materials and their performance. It is possible that, in some cases, the replacement is a wise engineering step which should have been taken long ago in the interest of both economy and performance.

Bundyweld tubing, which has attracted so much interest in the refrigeration industry, is a steel tube made by laterally rolling a copper coated steel strip into the form of a double walled tube, which is then brazed.

The brazing operation is carried out in a reducing atmosphere furnace where the joining of the surfaces is accomplished under very carefully controlled conditions. In the brazing furnace the copper of the strip diffuses into the steel and becomes the bonding material. Also, during the brazing the furnace atmosphere is controlled so that no oxides are formed at the surfaces; thus the tube is produced with a clean, bright, copper-colored coating inside and out. The color is due to the copper-rich layer of the copper-iron alloy, and the properties of this layer are those of the alloy and not of pure copper.

Following the brazing operation, the entire tube is electrically inspected in a device developed for this purpose by the research staff of Bundy Tubing Company.

* Research Metallurgist, Bundy Tubing Co.

The steel used in all Bundyweld tubes is a selected grade of S.A.E. 1010 of the following chemical composition:

Carbon	.05—.15 per cent
Manganese	.30—.60 per cent
Sulphur	.045 per cent, max.
Phosphorus	.055 per cent, max.

This steel is produced under carefully controlled steel making conditions to insure the desirable combination of mechanical properties and freedom from surface imperfections.

Fig. 1 is a photomicrograph of a cross section of a Bundyweld tube and it shows (1) the construction of the tube, (2) the ferritic matrix of the steel, and (3) the uniform diffusion of the copper within the ferrite grains.

The average mechanical properties of Bundyweld tubes in the annealed condition are as follows:

Yield Strength	30,000—36,000 lbs. per sq. in.
Ultimate Tensile Strength	45,000—52,000 lbs. per sq. in.
Elongation in 2"	30—40%
Rockwell Hardness (30 T Scale)	43—50%

It is this combination of strength, ductility and hardness as well as manufacturing process which is responsible for the ease of fabrication typical of Bundyweld tube.

Of particular importance to the refrigeration industry is the performance of Bundyweld tube under repeated stress. This property is measured in a fatigue machine in which the specimens are stressed while being rotated. Fig. 2 shows the results obtained for ¼"—.028" tube.

The endurance limit is about 29,500 lbs. per sq. in., or a safe maximum allowable stress

$$Sm = .588_{T}$$

where $^{8}_{T}$ is the ultimate tensile strength of the specimen.

Another outstanding characteristic of Bundyweld tube is its resistance to vibration in assemblies in which fittings are used.

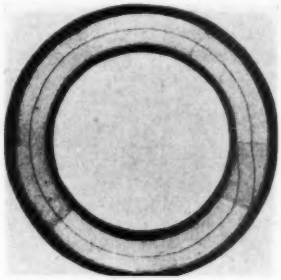


Fig. 1. Photomicrograph of a cross section of tube showing the construction.

Innumerable tests in a magnetic machine developed for testing fatigue life of tubes and fittings show that Bundyweld tubing is superior to any other tube tested. This may be explained by the fact that, in the double wall construction, the stresses are redistributed so as to avoid areas of high stress concentration.

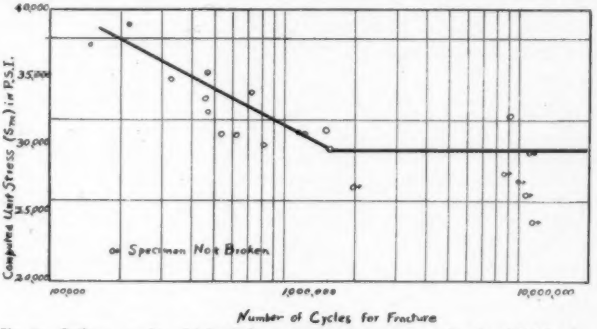


Fig 2. Fatigue results obtained from repeated stresses on Bundyweld tube in a fatigue machine.

Bundyweld tubes can be expanded by means of dies or by hydraulic pressure. The expansion is controlled by the diameter of tube and wall thickness.

Table A shows the average ultimate bursting strength as determined in the hydraulic testing machine.

Table A—Bursting Strength of Tubing

O.D.	Wall Thickness	Ultimate Bursting Strength lbs./sq. in.
3/16"	.020"	11,860
3/16	.028	16,500
1/4	.028	12,500
5/16	.028	10,500
5/16	.035	12,400
3/8	.028	8,700
3/8	.042	12,500
5/16	.032	8,500

Fabrication of Bundyweld Tubes

A large part of the success of Bundyweld tube is due to the ease with which it can be economically fabricated. In order to insure the best results at a minimum cost, some rules, the results of many years of experience, must be followed. These rules are stated in the following paragraphs:

Flaring

When S.A.E. or other types of fittings are used, it is of primary importance that the tube be cut square and burrs be removed, otherwise localized high stressed areas may result which may seriously damage the material. Although the "single flare" has been successfully used, experience has shown that the "double flare" illustrated in Fig. 3 gives results much superior to the common "single flare." This is because the upsetting of the end of the tube avoids the reduction in wall thickness at the base of the flare and the overlapping of the metal provides a smoother and more accurate seat for the fitting. The double flare may be formed by special machines at the factory or by hand operated tools specifically designed for this purpose.

The methods used for making bends are two: (1) Hand bend, and (2) draw or mandrel bend. In both cases, during the bending operation the outside metal of the tube is

elongated while the inside is compressed. Consequently, there is a tendency for buckles at the inside of the bend. The sizes of bends that can be successfully made in fabrication depend on wall thickness, diameter of tube and properties of the metal. Proper die design, especially in the case of hand bend, is essential to avoid wrinkling. Table B and Fig. 4 gives the proper radii for bending.

Machining

Fabrication may require some machining operations; such as cutting, chamfering or threading. No special recommendations can be given, since machines and tools used vary considerably. It is important to remember that machining is affected by (1) design of cutting tool, (2) speed of cutting, (3) composition of the tool and (4) the cutting fluid. For low carbon steel, high speed steel tools are to be preferred and cutting fluids should be emulsions of soluble oils or sulphurized mineral oils.

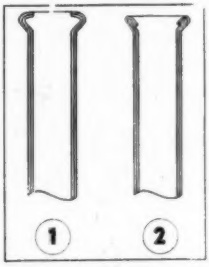


Fig. 3. Steps in double flaring of steel tube.

Joining

The joining of steel tubes may be made by (1) welding, (2) copper brazing or (3) soldering. Spot welding or seam welding can be used to unite tube to tube or tube to stampings. Copper brazing is successfully employed in joining the tube to steel stampings. For soldering the alloy used may be (a) tin-lead or "soft solder," or (b) copper alloys or "silver solder." The latter is to be preferred when the part must withstand vibration or relatively high stress. For both types of solders Bundyweld copper coating provides a surface highly suited for alloying with the soldering material.

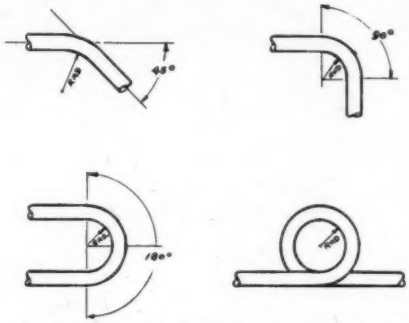


Fig. 4. Illustrating the various bends listed in Table B.

Successful soldering can be accomplished when the following rules are followed:

a The surfaces of the tube must be clean and free from foreign matter.
b The tube must attain a temperature higher than the solidus of the solder used; that is, the minimum temperature at which the solder becomes plastic.
c The flux should have a melting point lower than the solidus temperature of the solder so as to be very fluid and

TABLE B—MINIMUM RADIUS OF BENDS

TUBE SIZE O.D.	45° ANGLE OR LESS		90° ANGLE OR LESS		180° ANGLE OR LESS		CIRCLE	
	HAND BEND	DRAW BEND	HAND BEND	DRAW BEND	HAND BEND	DRAW BEND	HAND BEND	DRAW BEND
1/8	3/16 R	...	3/8 R	...	3/8 R	...	3/8 R	...
3/16	1/4 R	...	1/2 R	...	1/2 R	...	1/2 R	...
1/4	3/8 R	...	7/8 R	...	7/8 R	...	7/8 R	...
5/16	1/2 R	...	1 1/8 R	...	1 1/8 R	...	1 1/8 R	...
3/8	3/4 R	...	2" R	5/8 R	2" R	5/8 R	2" R	...
7/16	1" R	...	2 1/2 R	3/4 R	2 1/2 R	3/4 R	2 1/2 R	...
1/2	1 1/2 R	...	3" R	1 1/4 R	3" R	1 1/4 R	3" R	...
5/8	2" R	...	4" R	1 1/2 R	4" R	1 1/2 R	4" R	...

Larger Bends Recommended Where Possible. Hand Bends Preferred to Draw Bends.

avoid being entrapped in the solder when solidification takes place.

d Fluxes in general are corrosive; consequently, they must be removed thoroughly after the soldering operation. This can be best accomplished either by dipping in or spraying with hot water.

Many patented solders and fluxes are on the market and it is impossible to discuss all; however, it is good practice to follow the recommendations supplied by the producer. In general, the strength of any soldered joint depends on the thickness of the solder layer, which is determined by the clearance between the parts to be joined. For solders of the tin-lead alloy, maximum strength is obtained when the thickness is kept within 0.008—0.005 inch. The time of heating is also important since an increase in time of heating results in an increase of the amount of intermediate compounds formed, which decreases the strength of the joint.

Silver brazing alloys are essentially of two types; those containing phosphorus and those which do not. The former cannot be used for joining steel parts.

Many of the recommendations given for soft soldering apply equally well for silver solders. The strength of silver brazed joints has been proved to be highest when only a film of silver solder remains in the joint; hence, great care must be exercised in providing the proper clearance between parts.

Corrosion Protection

The problem of corrosion of steel tubes in refrigerating machines has been the subject of numerous investigations. It is well established that with moisture-free refrigerants the inside surface of the tube does not require protective coatings. Outside surfaces, where condensation, evaporation or freezing of water may occur, require protective coatings.

A tin coated tube may be furnished in which the coating of tin-lead alloy is applied by hot dipping. This coating, however, does not protect the surface under all conditions; furthermore, it may be damaged during bending if rough or scored dies are used. Other coatings can be applied to Bundyweld, such as (1) galvanizing, (2) electro-plating, (3) paints and (4) enamels of various types, depending on service requirements and available facilities. It is well to remember that, in general, when applying protective coatings to steel, the surface must be free from grease, oil and flux. Degreasers have been successfully used and fluxes must be removed by means of hot water. Experience has shown that many cases of failures of the coating are traced to the improper removal of fluxes. In cases where "Bonderize" treatment is desired, the copper coating must be removed. The stripping of this copper can best be accomplished in a cyanide solution without the use of electricity.

Uses of Bundyweld

Without listing the many applications of Bundyweld in the refrigeration industry, typical uses are as follows: Condensers, cooling coils, connecting lines and capillary tubes.

SERGEANT JOE HOLUB IN THE ARMY

Sergeant Joseph Holub Jr., who is with D Battery of the 122nd Field Artillery, is showing the women of Danville, Illinois, how he does the cooking. The Prairie Division came up from Camp Forrest, Tennessee, for the Armistice Day parade in Chicago and en route they stopped off at Danville where this picture was taken.

Joe Holub Jr. was West Side branch manager for the Harry Alter Co., in Chicago. He enlisted in the National Guards and is now acting as a mess sergeant.

The original picture was taken by the Chicago Daily News and was published in the November 10 issue.

Charles E. Earl,
Detroit, Michigan

I have subscribed to THE REFRIGERATION SERVICE ENGINEER for some time and have found it to be invaluable in many instances.

Operation and Installation of Penn Avrgaire Controls

By K. W. CASH *

ABOVE-freezing refrigeration applications have always presented problems of dehydration and shrinkage as one extreme, and sliming and spoilage as the other extreme. Both represent food waste and a loss to the owner of the walk-in cooler or display case.

This fact alone has been enough to arouse the interest of service engineers in the new Avrgaire control recently introduced by Penn Electric Switch Co. In addition, service engineers are now faced with the necessity of having to get improved and more efficient operation out of existing installations, because of shortages of materials, priorities, and so forth, with the result that many questions have been raised regarding the application and installation of these controls.

It is well to remember that basically these controls are standard temperature controls so far as range and differential adjustment are concerned. The only new feature is the long ¼ inch diameter Avrgaire bulb which introduces a new principle of bulb application. Heretofore temperature bulbs have been of two basic types—the fin type or air temperature bulb suspended in the cooled space, or the clap-on type bulb clamped to the evaporator coil and operating from evaporator temperature.

The Avrgaire bulb operates from both coil and air temperature as will become clear upon a study of installation recommendations. This control is not designed for and cannot be used as either a straight air temperature control or a straight clamp-on temperature control. Neither is it suitable as a liquid immersion control, except for very wide differential service. This statement, "For very wide differential service," naturally leads the service man to wonder how such a control can maintain box air temperature differential with 2° F. overall change (Fig. 3), but the secret of the installation is in the bulb itself.

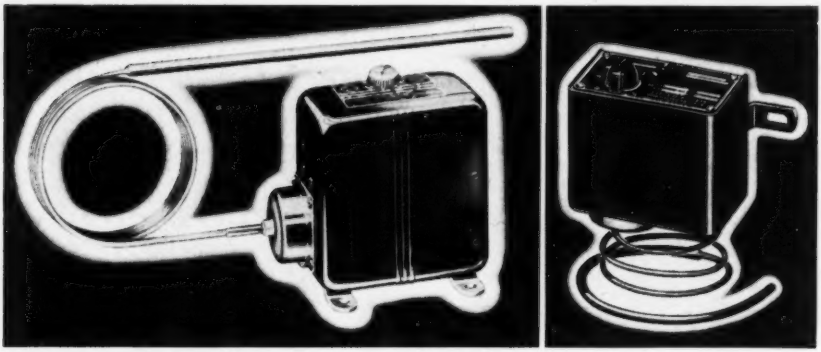


Fig. 1. (left) Penn Type 260T15 Avrgaire control with limited finger-tip range adjustor. Available as 260T16 with screwdriver range adjustor.
Fig. 2. (right) Type 265T15 control with limited finger-tip range adjustor. Available as 265T16 with screwdriver range adjustor.

* Penn Electric Switch Co., Goshen, Ind.
Paper presented at New York State R.S.E.S. Convention

Fig. 4 is a simple artist's drawing of the recommended method of installation of the temperature bulb. Note that the free end of this bulb is clamped, by the special bulb clamp provided, to the first return bend of the evaporator coil. The bulb should be inserted, at first, so that it completely fills the clamp as shown in Fig. 5-A. The first return bend is recommended as an installation point for the bulb so that false coil temperatures which might be created by a slight leak in the expansion valve will not unduly influence the operation of the control. This means that on forced convection coils and, in fact, on any installation, the clamp

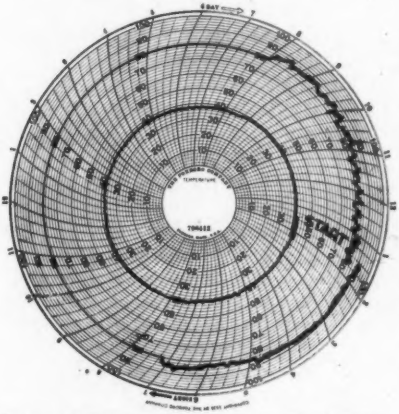


Fig. 3. Temperature and humidity are accurately controlled with these controls. The inside chart represents temperature control on an actual installation; the outside chart represents humidity control.

location with respect to evaporator coil, should be approximately three to four linear feet of coil length away from the expansion valve.

After the bulb has been clamped into position, it should be bent in a fairly wide arc to such position that the balance of the length of the bulb is down alongside the evaporator coil and back under a portion of the coil. In other words, the portion of the bulb not held by the clamp should be in the cold air stream from the evaporator coil. This is illustrated in a general way in Fig. 4. Sharp bends in the bulb should be avoided just the same as sharp bends or kinks are avoided in capillary tubing of temperature elements. The control itself may be mounted by the feet provided in any convenient location on the inside wall of the refrigerated space. One point to be kept in mind is that the capillary tube of the temperature element and the bulb itself (except for the portion contained in the clamp) should not touch the evaporator coil or the high pressure or suction lines to the coil.

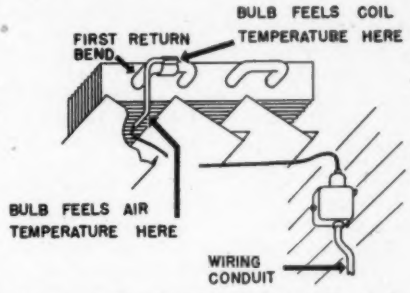


Fig. 4. Artist's drawing of the application of the bulb to an evaporator coil.

Avrgaire controls are wired the same as standard Penn 260 and 265 Series single pole controls. After the bulb and control are located the wiring to the control should be completed.

The controls are factory set, in a liquid bath, for a mechanical differential of approximately 10° F. When the bulb is installed as outlined above, actual air temperature

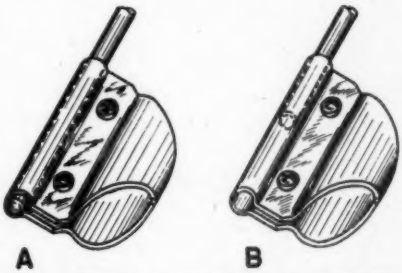


Fig. 5. Drawing A at left indicates by dotted lines the normal position for the Avrgaire bulb in the clamp provided. Drawing B at right indicates alternate position for bulb for conditions as discussed here.

differential is approximately 2° F., because the control operates from an average of coil and air temperatures. This is illustrated in Figs. 6 and 7. Let's assume that the control is set to operate at a bulb temperature of

35° F. (cut-in) to 25° F. (cut-out). This means that the average bulb temperature at the cut-in point is 35° F. as illustrated in Fig. 6. This average bulb temperature is produced by an air temperature of approximately 37° F. acting on the major portion of the bulb and a coil temperature of approximately 33° F. (above defrost point) operating on the clamped portion of the bulb. When this combination of temperatures exists, the control will cut in and start the compressor.

As soon as the compressor starts, it is obvious that the coil temperature will be brought down much more rapidly than air temperatures. This operation eventually produces the bulb condition shown in Fig. 7. In other words, the air temperature acting on the bulb will have dropped to approximately 35° F. and, in the meantime, the coil temperature acting on the clamped portion of the bulb will have dropped to approximately 12° F. Under these conditions the average bulb temperature will be approximately 25° F. or the cut-out point of the control, at which point the compressor will stop.

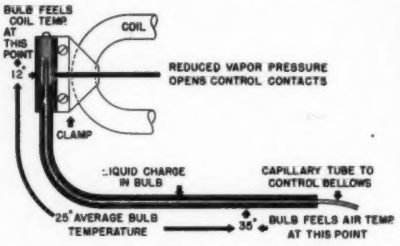


Fig. 6. Cross section view of bulb showing how coil and air temperature provides the "average" bulb temperature necessary to start the compressor.

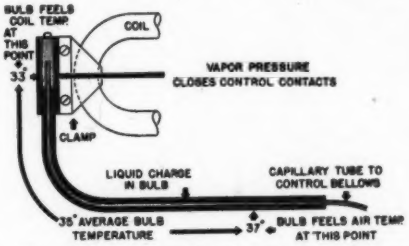


Fig. 7. This cross section view of the bulb shows typical coils and air temperatures necessary to stop the compressor.

This average temperature of the control bulb at the cut-in point is always constant for a given setting under all load conditions as is the average bulb temperature at the cut-out point. It is obvious, however, that a variation in air temperature from "normal" at either operating point necessarily would mean an adjusting variation in the coil temperature to achieve the average bulb temperature necessary for operation. This is illustrated in Fig. 8. Under normal operating conditions for a given temperature requirement, for example, 35° F. to 37° F. box temperature, the control would cut in at a coil temperature of approximately 33° F. and an air temperature of approximately 37° F. In this case, it would cut out at a coil temperature of approximately 12° F. and an air temperature of approximately 35° F. Then, under normal load, the coil temperature would rise gradually as air temperature rose until the two again reach the normal cut-in values of 33° F. coil temperature (defrosting assured) and 37° F. air temperature.

Suppose, however, that the walk-in cooler or display case is loaded with warm meat or produce. In such a situation the air temperature rises rapidly—in fact will go above the normal cut-in setting of the control—and will be high in relation to the coil temperature. The effect of this warmer air on the portion of the bulb exposed to the air stream will then over-balance the effect of the coil temperature and thereby cause the control to cut in at a coil temperature of 31° F. or 32° F. Note, however, that even under this condition, the coil temperature is not pulled lower than approximately 11° F. and that the running time of the compressor is approximately the same as for a normal load. However, because of the effect of the warmer air temperature, the coil temperature is brought up rapidly to the cut-in point of the control and the next operating cycle is started with less than the usual standby time. While this operation does eliminate the defrosting of the coil under heavy load condition, it likewise eliminates the long operating cycle and the extremely low coil temperature at the "cut-out" end of the cycle. Thus, wide variations between coil and air temperature are eliminated, which not only remove moisture in themselves, but create an undesirably rapid

movement of air over the meat or produce. Of course, as soon as air temperature is brought down to the normal or desired level, due to these more frequent operating cycles, the operation reverts to regular cycles which permit defrost on each standby. This principle of operation is explained as "selective defrost."

Making Final Adjustment

From the above, it is obvious that an Avrgaire control cannot be set for desired operation in a warm box or in a box that has just been loaded with warm produce. After the installation is completed, as outlined above, the compressor should be allowed to operate through several cycles, especially if installed in a warm box, before final adjustments are checked. After the

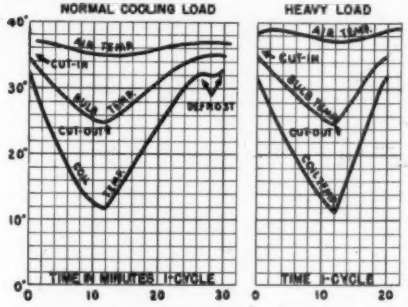


Fig. 8. Running cycles are practically the same under normal or heavy load conditions; "off" cycles vary according to the cooling load. Coil defrosting occurs only when air temperature is down to desired point.

box load has been reduced to normal or approximately the desired air temperature, the cut-in point of the control can be set by means of the adjusting knob or adjusting screw (depending upon the type control) at a point which will insure coil defrosting on each standby. If, then, a check on the air temperature within the system shows that temperatures are varying too widely (check with accurate thermometer), then the control differential should be narrowed by means of the standard differential adjustor in the control.

If air temperature is being held to a closer differential than necessary and perhaps running slightly high, in spite of the fact that the cut-in point is set just sufficiently high to permit coil defrosting on each cycle, then the bulb clamp should be loosened and the bulb slipped partly out of the clamp to lessen the bulb area in contact with the clamp itself. This is illustrated in Fig. 5-B. This adjustment reduces the coil effect and permits pulling the coil down to a slightly lower temperature at the cut-out point, giving slightly wider air temperature differential. This produces the lower average air temperature desired while still permitting the defrost on each cycle. Ordinarily this is the only adjustment necessary to secure the desired wider air temperature differential, but on applications involving undersize coils or poor air circulation, it may be necessary to widen the control differential with the regular adjustment inside the control.

Variations Should Be Limited

It is well to remember that variations in coil temperature should be limited to as narrow a differential as will provide the desired average box temperature while still permitting coil defrost on each cycle. When this setting is achieved, humidity will be carried at a much more uniform level, thus reducing problems of dehydration and sliming.

These controls are designed to provide coil defrosting under normal load conditions, yet still maintain a very uniform spread between coil and air temperature, and consequently a very uniform humidity condition. Installation results indicate that the control does a remarkably good job of performing these functions. While the installation is not difficult, proper functioning of the system depends upon installation points outlined above. This material is presented to enable refrigeration service engineers to be thoroughly familiar with the principle of Avrgaire control operation.

Luis A. Francis,
Puerto Rico.

THE REFRIGERATION SERVICE ENGINEER is so instructive that I just can't do without it.

Glen S. DeHart,
Chicago, Ill.

Thanks for continuing my subscription to THE REFRIGERATION SERVICE ENGINEER. I would hate to miss any issues because I get a lot of valuable information from every one of them.

Service Notes on The Grunow Refrigerator

By PHIL GREGOR

THE Grunow refrigerator was manufactured during the years of 1933 to 1937 inclusive. A list of the models produced during that time, together with the essential service data of each is shown in Table 1. All 1933 cabinets employed the model "C" compressor and all 1934 cabinets were equipped with model "D" compressor. The "H," "J" and "K" compressors were used in 1935, the "M" and "R" in 1936 and the "W" in 1937.

While there are several types of condensing units, their construction is very similar. The carrene charge is approximately 3 lbs. A high side float or a meter and receiver assembly can be interchanged. A model "C" compressor does not have the motor stator in the dome, but employs a shaft seal in the main frame under the motor rotor. The compressor rotor is in a horizontal position rather than a vertical. All units have condenser radiators, and either a separate 25 watt fan, or in the case of model "C" the fan is attached to the end of the motor shaft.

With the exception of the model "C" the main difference between these various

TABLE I—OIL AND REFRIGERANT CHARGE FOR GRUNOW REFRIGERATORS

Year	Model No.	Refrigerant Used	Refrigerant Amount	Oil	Motor Size	Refrigerant Control	Belt Size
1933	50-G	CAR	3.8 lbs.	24 ozs.	1/6	HSF	Direct
	60-G	CAR	3.8 lbs.	24 ozs.	1/6	HSF	Direct
	70-G	CAR	3.8 lbs.	24 ozs.	1/6	HSF	Direct
	50	CAR	3.5 lbs.	24 ozs.	1/6	HSF	Direct
	60	CAR	3.8 lbs.	24 ozs.	1/6	HSF	Direct
	70	CAR	3.8 lbs.	24 ozs.	1/6	HSF	Direct
1934	46	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	65-SD	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	80-SD	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	54-D	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	65-D	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	80-D	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
	50-D	CAR	3.8 lbs.	50 ozs.	1/6	HSF	Direct
1935	50-S	CAR	37 ozs.	36 ozs.	1/6	HSF	Direct
	51-D	CAR	40 ozs.	36 ozs.	1/6	HSF	Direct
	56-SD	CAR	40 ozs.	36 ozs.	1/6	HSF	Direct
	60-S	CAR	40 ozs.	36 ozs.	1/6	HSF	Direct
	61-D	CAR	40 ozs.	36 ozs.	1/6	HSF	Direct
	67-D	CAR	44 ozs.	36 ozs.	1/6	HSF	Direct
	67-SD	CAR	44 ozs.	36 ozs.	1/6	HSF	Direct
	82-DSD	CAR	50 ozs.	36 ozs.	1/6	HSF	Direct
	82-HSD	CAR	50 ozs.	36 ozs.	1/6	HSF	Direct
	82-SD	CAR	47 ozs.	36 ozs.	1/6	HSF	Direct
1936	50-M	CAR	3.5 lbs.	36 ozs.	1/6	Cap T	Direct
	51-M	CAR	3.8 lbs.	36 ozs.	1/6	Cap T	Direct
	58-M	CAR	3.8 lbs.	36 ozs.	1/6	Cap T	Direct
	61-M	CAR	3.8 lbs.	36 ozs.	1/6	Cap T	Direct
	67-M	CAR	3.8 lbs.	36 ozs.	1/6	Cap T	Direct
	70-R	CAR	4.1 lbs.	36 ozs.	1/6	Cap T	Direct
	82-R	CAR	4.1 lbs.	36 ozs.	1/6	Cap T	Direct
1937	53-W	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	63-W	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	58-WD	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	67-WD	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	68-WD	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	68-WSD	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct
	83-WSD	CAR	2.12 pt.	36 ozs.	1/6	Cap T	Direct

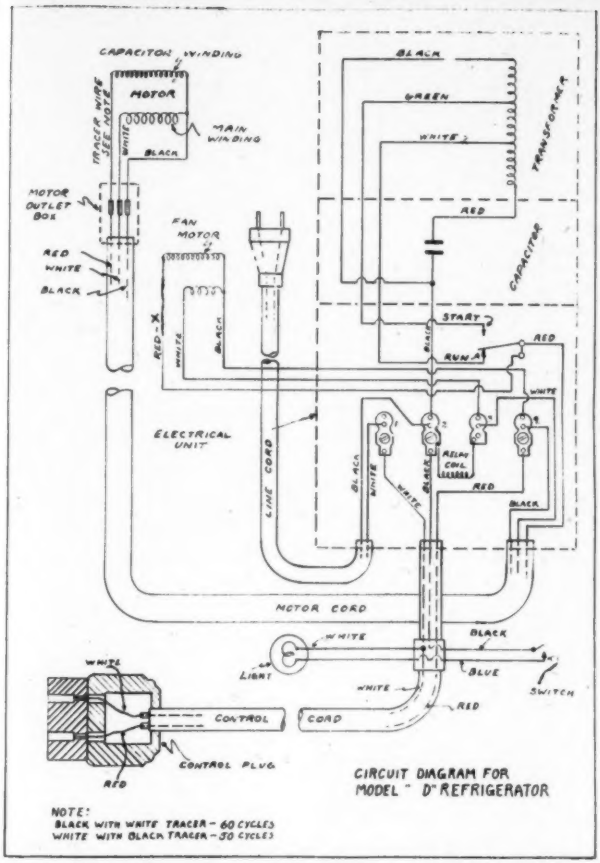


Fig. 1. Wiring diagram for all models except "J," "K" and "M" Grunow units. If fan on unit is two wire, disregard the wire marked X going to the fan in this diagram.

models is in the horsepower, the type of electrical system and in the refrigerant meter device used. It will be noted from Table 1 that up to and including 1935 a high side float was used as standard equipment while during the last two years of manufacture a capillary tube was used. These two metering devices are interchangeable with any model.

The construction and operation of the model "C" compressor was described and illustrated in the July 1933 issue of this journal and the models "M" and "K" in the June 1936 issue. Since these issues are still available and since other models were fundamentally the same, no further description is needed here.

Most units have a built-in dehydrator and it is very advisable when repairing one of those units to remove it. If a new dehydrator is replaced in the unit be sure to use one of sufficient capacity to prevent the clogging or stopping up of either the outlet or inlet end of the dehydrator.

Electrical System

All units have either a relay condenser starter or a relay condenser transformer starter. The wiring diagrams for each are shown in Figs. 1 and 2.

The Thermostat

The regular bellows type of thermostat is used, but it is advisable to bring to your attention the fact that different models of the same year use a different thermostat. They are different in that they have a different cut-in and cut-out point. The type of thermostat used is determined by the location of the capillary bulb on the evaporator.

This is a very important point to remember when replacing a defective thermostat. Since there are so many different models and different types of thermostats for these models, it is suggested before replacing a thermostat to consult the control manufacturer's recommendations for that particular replacement.

Oiling System

Any machine which operates in oil, atomizes a certain amount of the oil. In the Grunow, no serious decrease in efficiency is caused by a large amount of oil mixing with the carrene in the evaporator. However, the oil belongs in the compressor for lubricating purposes; therefore, the Grunow employs an oil separator of a distilling nature.

Since carrene boils rather violently it does a considerable amount of splashing. In the upper part of the evaporator, shown in Fig. 3, is an inclined tube. During the violent boiling of the liquid some of it splashes to the upper end of this tube and runs down the incline over a series of dams. This inclined tube is made of copper and is placed outside the evaporator between the two headers where the temperature is the highest. As the mixture runs over the dams, the carrene evaporates and nothing but the oil reaches the lower end. There it goes through a hole provided in the lower end which permits the oil to drop directly into the suction line. From there it returns to the compressor.

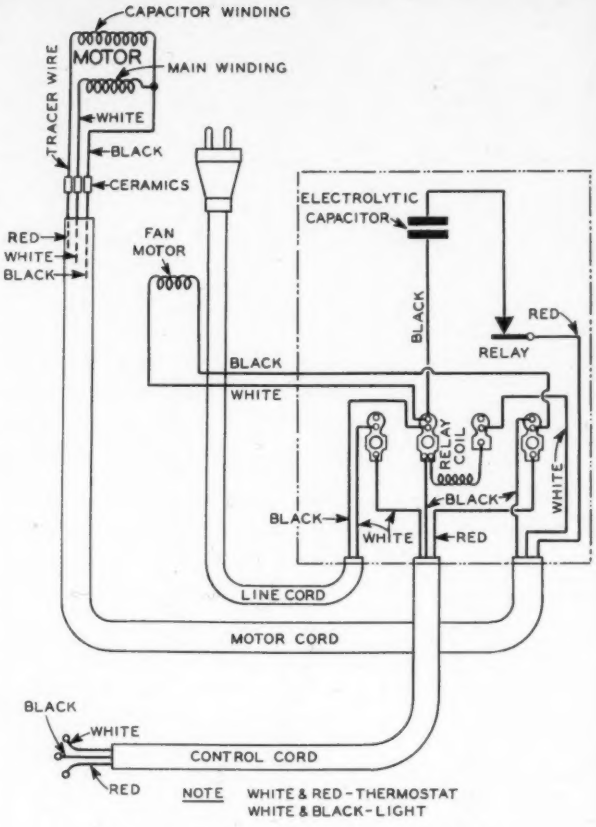


Fig. 2. Wiring diagram for the models "J," "K" and "M" units

Fan

While most fans equipped on the Grunow are sealed, there has been quite a little difficulty in operation by the fan freezing. When diagnosing the ailments of a Grunow, it is always a good idea to check the condition of the fan. On one type of fan, of which the body is square, there is a small screw near the front on the topside which can be removed for oiling purposes. All other types are sealed and cannot be lubricated.

Troubles and Causes

Items in italics are most frequent causes

1. **Unit operating too long.**
   1. Thermostat bulb loose in clamp.
   2. *Wrong type of thermostat.*
   3. *Condenser-radiator coated with dirt.*
   4. *Air in system.*
   5. Refrigerator exposed to sun rays.
   6. Poor door seal.
   7. Overcharge of carrene.
   8. Defective compressor.

9. Plugged liquid line.
10. Leaky float ball.
11. Insufficient carrene in evaporator.

II. Erratic operation of unit—all items in I plus:

1. Float valve clogged.
2. *Leaky float valve.*
3. *Clogged suction screen.*
4. Clogged meter tube screen.
5. Under or over charge of carrene.

III. Unit operates continuously—all items in I and II plus:

1. Float stuck closed.
2. Shorted circuit.
3. Frozen liquid line.

IV. Unit does not operate.

1. *Low line voltage.*
2. Defective thermostat.
3. Wrong electrical connections.
4. Defective starting relay.
5. Burned out overload trip.
6. Burned out stator.
7. *High head pressure.*
8. Defective condenser or transformer.
9. *Stuck pump.*

V. Overload cutout trips repeatedly.

1. Defective overload trip.
2. Low voltage.
3. Pump stuck.
4. Short in motor or relay, condenser assembly.
5. Poor electrical connections.
6. Fan not operating.
7. Air in system.
8. Condenser radiator clogged.
9. Relay stuck or contacts are dirty.

VI. Unit runs but defrosts.

1. Improper setting of thermostat.
2. *Undercharge of carrene.*
3. Defective wiring.
4. *Air in system.*
5. *Float, liquid line, suction screen or meter plugged.*

VII. High current consumption.

1. Air in system.
2. Fan not running.
3. Compressor inefficient.
4. Leaky float on check valve.

VIII. Noise, at start or after unit has been turned off.

1. Vanes striking sides of pump at start.
2. *Broken buffer springs.*
3. Broken support spring.
4. Suction tube vibrating.
5. Condensed refrigerant in compressor dome.
6. *Starting relay defective.*
7. Leaky check valve.

IX. Evaporator defrosting on one side.

1. Leaky check valve.
2. Undercharge of carrene.
3. Evaporator tubes obstructed.

X. Evaporator freezes ice but warm food compartment.

1. *Evaporator needs defrosting.*
2. Bad circulation of air around evaporator.

(To be continued in the January issue)

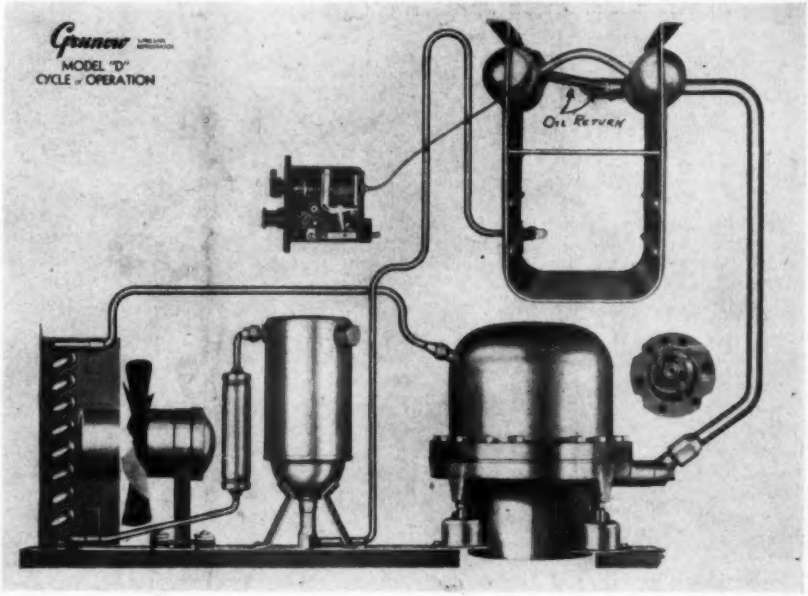


Fig. 3. Model "D" Grunow unit in which is shown the oil return tube in the evaporator.

COMMERCIAL

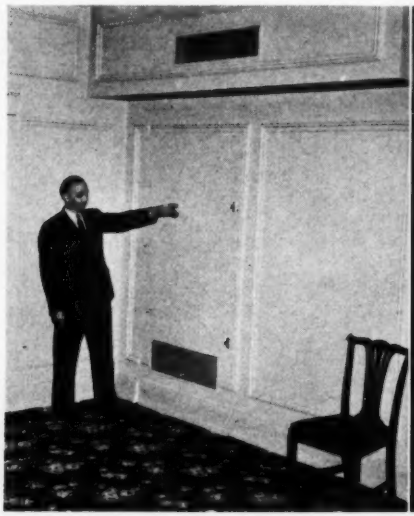
INCREASE BUSINESS BY DOING A MORE EFFECTIVE JOB OF SELLING *Selling*

Hotel Cooled with Packaged Conditioners for Flexibility of Operation

By Robert A. Latimer

A "MODEL" installation of both packaged and central station air conditioning equipment which serves the entire third floor of the Hotel Penn-Harris, Harrisburg, Pa., has been the means of effecting great economy. A number of individual systems, all operating in various parts of the ballroom floor of the building, not only provide great flexibility of control, but made it possible for the equipment to be installed at a cost much lower than that estimated for a large central station plant.

George J. Humbert, executive engineer for the United Hotels Company of Amer-



A. N. Brent, building engineer, points out one of the panels which conceals the largest of the group of coolers

Here is another typical method of concealing the conditioners. Three horsepower conditioners are used in these spaces

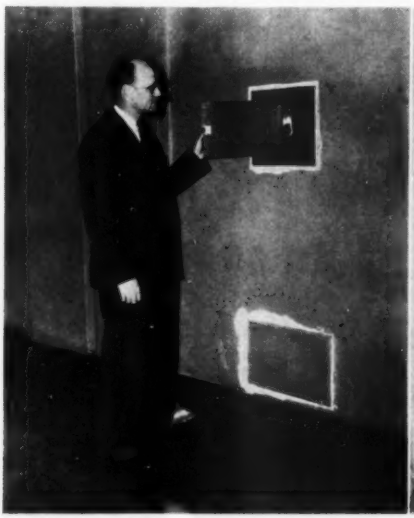
ica, Inc., has a thorough understanding of the problems that arise in hotel air conditioning, particularly in areas where loads vary widely from hour to hour. This has been found to be true of ballroom floors, which normally have numerous meeting rooms, assembly rooms, at least one large ballroom, and often several bedroom suites.

This is the type of floor that may be empty one day—and packed to capacity when a large convention moves in the next. At other times only part of the meeting rooms will be crowded with people, and the balance of the floor will not be in use.

In approaching the problem of providing air conditioning for this type of hotel floor, Mr. Humbert reasoned that one large central station system would be very expensive, as it would require extensive remodeling of the building itself to provide space in the corridors for supply ducts and for handling return air. Then if such a system were in use the control set-up would have to be very elaborate in order to balance the operation of the system against the existing crowds in various parts of the floor.

To meet this problem, Mr. Humbert selected two Chrysler Airtemp central station systems; one having a 40-HP. radial compressor for use in the large ballroom, and a second 25-HP. radial system to serve the large assembly room. In both rooms the radial machines "float" against the existing load, responding instantly to any change in occupancy, thus operating with unusually high efficiency. Each of these systems is completely independent in operation and in control, and both are equipped with evaporative condensers located on the adjacent roof of the building. Each installation has its own air distributing system and fresh air supply, so it is possible to control both temperature and humidity in either of the large rooms, irrespective of the occupancy factor encountered.

For air conditioning a series of meeting rooms and the main corridors, Mr. Humbert employed eight 3-HP. Airtemp self-contained air conditioners and one 5-HP.



The thermostatic controls for conditioners in meeting rooms are contained in boxes, such as shown here, outside the meeting rooms.

One of the 40-hp. Airtemp compressors used on the job. A 25-hp. compressor is located in another part of the building.

conditioner of the same type. The 3-HP. conditioners are recessed in unused spaces between the rooms; access is provided through special doors opening from the meeting rooms. A typical access door is shown in the photographs that accompany this article.

Controls Are Concealed

The control set-up for the packaged air conditioners is important to the success of the system. Mr. Humbert wanted the various meeting rooms to be under full thermostatic control, but he did not want the occupants of the room to have access to the thermostats themselves. To meet this situation special thermostats were mounted on panels outside the meeting rooms so that A. N. Brent, resident engineer in the hotel, can make necessary adjustments in the setting of the thermostats without disturbing the occupants of the rooms.

Fresh air for the main corridors and the meeting rooms is supplied by the 5-HP. air conditioner which operates with 100% fresh air—taken from an adjacent point on the outside wall of the building and fed into the halls. This conditioner uses only a small portion of the space provided for a powder room. Fresh air supplied to the halls enters the intakes of the recessed conditioners through special grilles built in the walls between the hall and the recessed spaces.

Complete Control Obtained

This arrangement keeps both the corridors and meeting rooms fresh and clean at all times, no matter how much smoking is done when a large convention is in progress. The large assembly room and ballroom have independent fresh air connections.

Sleeping room suites on the same floor are served by eleven ¾-HP. floor mounted cooling units, each with individual control.

With the flexibility of design used by Mr. Humbert in the Penn-Harris Hotel it is possible to operate any part of the air conditioning system without using the other parts. For example, the ballroom system can be operated independently of the balance of the floor, or one of the small meeting rooms can have cooling when the rest of the floor is not in use.

Installation work was handled by Tiltz Air Conditioning, Inc. of New York City under the direct supervision of Bernard M. Tiltz.

Clever Letter Explains Merchandise Shortages

By Herbert Hanley

IT is difficult in these days of limited production, foreshortened delivery and other OPM headaches to find much humor in the situation. However, a refrigeration supply manufacturer in St. Louis, Missouri, has kept his temper sunny enough to write the following clever poem in answer to complaining letters from dealers and retail outlets who cannot get merchandise on order for months. The poetic response in every case is as follows:

Keep your temper, gentle sir,
'Cause we, as manufacturer
Know your order's overdue
For a month, or maybe two.
We can't help it, please don't swear,
Labor's scarce, and metal's rare.
Can't get steel. Can't get dies.
These are facts. We tell no lies.
Harry's drafted, so is Bill,
And all our work is now uphill.
So your order, we're afraid
May still be a bit delayed.
But you will get it, don't be vexed.
Maybe this month, maybe next.
Keep on hoping. Don't say die
And we'll fill your order bye and bye.

The salesmanager reports a more pleasant attitude on the part of retailers who read the poem, then with a little more understanding, "grin and bear" the situation.

"Sell New Equipment"

Too many service men are content to rebuild commercial equipment when the customer is really in the market for something new.

By John D. Mueller

AS THE old saying goes, "if a man builds a better mouse trap the world will beat a path to his door."

Jack Langston, who has been selling and servicing commercial refrigeration in the Dallas area for years, has demonstrated that prosperity awaits the man who builds on the basis of sound experience.

In the period since 1938, when Mr. Langston and his son, Jack Langston Jr., began manufacture of commercial equipment in the loft of their business establishment on "Refrigeration Row" in Dallas, progress has been steady. From a plant in which equipment included no more than a band saw, rip saw and six-inch jointer plane, and two workers, the organization has grown to one which now occupies a new establishment; modern in every detail, and providing employment for the heads of 22 Dallas families. Its refrigerator equipment, the America line, is reaching out steadily over a 200 square mile area around Dallas. Seven men now are engaged in selling this equipment.

For 18 years or so before he ventured into the field of manufacture, Mr. Langston was a salesman of food store equipment and then of refrigeration. He saw in this new development opportunity for continued growth and success, and turned his chief attention to it. He became not only a salesman of ability, but a service engineer. He mastered in all its detail the theory and practice of modern mechanical refrigeration.

Taking close personal interest in all service work as well as the sale of refrigeration, Mr. Langston saw in his area need for a variety of equipment not available. There was a large and profitable market, he felt, in those fields of buyers not within reach of existing builders. He set himself to the task of engineering and building a type of low-cost equipment which would meet this market.

It was thus that the Jack Langston Co., as a manufacturer of refrigeration, had its beginning. Construction was begun in the store loft, operations obviously were modest. At the start five and six-foot cases alone were built—and not many of them. With the machinery and the help available, output averaged one six-foot case every 10 days.

The market was found, as Mr. Langston had believed, ready and waiting. There were buyers whose incomes previously had held them to the purchase of used equipment.

"I saw there was opportunity for sale of equipment of a certain type within a certain price range," said Mr. Langston. "We set about to make something no other builder was making. We began to build what my experience and observation has indicated the trade wanted in certain lines. We are not in competition with any other manufacturer for the reason we are not building what any other builds."

All of the equipment now built by the company has been engineered by Mr. Langston, who, incidentally, is vice president of the Lone Star Chapter No. 1 of the Refrigeration Service Engineers' Society, and who since its organization has been one of the most active members.

"In our new plant we will be able to turn out three cases daily, in six, eight and 10-foot sizes. We also are equipped to build special cafe jobs, beverage coolers, etc. Also, we will manufacture meat

blocks, and similar food store equipment.

"Much of our present work is of the custom-built type. We sell a man what he wants and needs. We build to fill his requirements. We can do this since we are equipped to do all of our metal cutting, shaping, etc. We cannot handle our own porcelain work, but have all of it done here in Dallas.

"One of the reasons I felt sure there was a market awaiting, was that used equipment so often was so antiquated that the man who bought it seldom could approximate modernity. For that reason we rarely rebuild any of the used equipment which is taken in trade. Virtually all of it is junked.

"We don't consider the customer merely an outlet for used equipment, but hold that he offers a real market for new if he can get the kind he wants. That was the whole basis of our start."

Ground for the new plant, located at 3700 Elm Street, with rail facilities at hand, was broken on July 14, last. The plant was ready for occupancy on Nov. 1st. The new building has been constructed of brick, tile, steel and glass. It is all on one level, making it possible for the owner to have his desk in the center, and to observe all operations. Fluorescent lighting is available throughout. Each unit of equipment in building is individually powered.

The plant has a floor area of approximately 17,000 square feet. Fronting Elm Street is a plate glass lighted display area, with 100 front feet of glass.

"We invited all of our friends, our competitors, our customers—and some of our enemies—to attend a formal opening as guests of our company," concludes Mr. Langston, and sums up, "our experience tells us that selling a man used equipment, merely to get rid of it, is just tying a millstone around your own neck. There is a ready market for new installations, and with a little of the right kind of salesmanship, it can be sold."

The show room of Jack Langston Co., where the products manufactured by him are shown on display. Among these products are walk in coolers, display cases, reach in coolers and others

Production Needs Health

Combination Vegetable Display Case Uses Ice and Mechanical Refrigeration Too

By Donald Delayen

HOW a refrigeration service engineer can sometimes aid his customers with a bit of sound advice on the use of refrigeration in increasing sales, is ideally illustrated by a novel combination ice and refrigerated produce display fixture, now in operation at the White Eagle Super Market, one of the largest super grocery stores of Colorado Springs, Colorado.

Here, store manager J. M. Vaeth had continually run up against a common problem in the merchandising of produce and vegetable lines (his pet department) in the fact that once the refrigerated and fresh-appearing vegetables which line the department were gone, they had to be replaced with stock with much less eye-appeal. Particularly on busy days when the entire displayed stock was "cleaned out" in a few hours was this problem bothersome—for the lettuce, cabbage, carrots, potatoes, tomatoes, etc., rushed into the breach invariably presented a much less spruce and fresh appearance. "This problem is particularly important with us inasmuch as around 40% of our store volume is in fine produce lines," Mr. Vaeth explained. "And consequently this merchandise is a drawing card which we hate to see lose any part of its appeal."

Accordingly, Mr. Vaeth presented the problem to a local refrigeration service firm which had been maintaining storecase and cooler refrigeration for several years—pointing out that the chief need was continuance of the fresh appearance which refrigeration ordinarily provided. After studying the plan, the refrigeration service firm provided the perfect solution by reversing the idea of cooling only the produce on display—and instead worked out a combination where the "forward stock" or replacement produce is pre-cooled for quick addition to the display without a sacrifice in appearance. All that was required to make this possible was construction of a special type of display fixture which uses ice, instead of mechanical reservation, to preserve freshness on display, while the forward stock is being pre-cooled for later sale.

All stock on reserve at the White Eagle market is now kept in a three-door cabinet, compressor refrigerated, which contains enough stock of produce to answer for any rush day's business. Lettuce, cabbage, etc., kept here is refrigerated at a temperature of around 45° for at least eight hours overnight before being taken out for sale. This prevents wilting or soiling which takes sales appeal away.

This is a sixteen-foot shallow enclosure which fits neatly atop the reserve-stock case, with bins for each type of produce on display. The upper fixture is waterproofed, and has a false bottom of screen wire over a drain tray from which several drain tubes lead to a basement sewer drain. All vegetables are then stacked atop the wire screen according to their bins, and are "set" in cracked ice which not only keeps produce at its best appearance, but makes for a handsome background.

Now, the stock on sale is kept continually on ice, this replaced from a 300 pound per day order from a local ice company. As soon as one bin of vegetables is cleaned out, it is quickly replaced with fresh stock from the refrigerated case below. Ice costs, naturally, are a slight extra expense, but this has been compensated for in the fact that shrinkage costs (from 4 to 8% in many markets) is kept to below 2%. Thus the combination provides customers of the market with always-fresh produce, and acts as a goodwill builder which brings the store many extra sales per customer.

New and Improved Appliances

Information contained in this department is furnished by the manufacturer of the article described and is not to be construed as the opinion of the Editor.

Squeegee Type Pump

THE Downingtown-Huber pump is entirely different, operating on a new "Squeegee Principle" which is unlike a centrifugal, rotary, reciprocating, screw or diaphragm pump. Briefly, it consists of a flexible rubber tube which is alternately squeezed and released in a rocking squeegee manner so that the liquid or gas is actually breathed into and out of the tube. The liquid or gas being pumped is totally enclosed within the tube from the time it enters the pump until it leaves, thus it cannot come in contact with any metal part of the pump.

The tube itself can be made of pure gum rubber and various acid and oil resisting synthetic materials; in addition, rubber tubes can be lined with synthetic materials for corrosion resistance or to prevent contamination. Cleaning or sterilization is easy and does not require taking the pump apart.

Solutions containing solids, whether abrasive or otherwise, cause practically no wear, since the inside of the tube is a smooth, continuous surface, with no projections, corners, crevices, or similar vulnerable places. High percentage of solids, high specific gravity of solids or solutions and viscous or stringy solutions are safely handled, for whatever can be drawn into the pump can be pumped out.

No Agitation

No churning or agitation is caused by the pumping action. Likewise, hot or cold liquids or gases do not affect the operation of the pump or the life of the tube. The pump is noiseless in operation, due to the cushioning action of the tube between moving and stationary parts of the pump.

The Squeegee Pump has a high efficiency and a sure, passive action with practically no slippage, therefore it may safely be used for accurate proportioning.

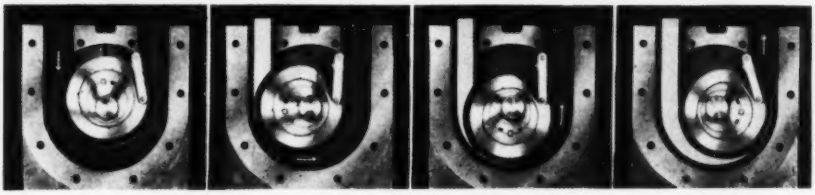
No Moving Parts

No moving parts of the Downington-Huber Squeegee pump are in contact with the liquid or gas being pumped, except the tube, which is externally compressed and released. In addition, there is practically no wear on the outside of the tube, since the compressor ring merely rocks against the tube, without any rotating, rubbing action. The repeated flexing of the tube has little effect on its life and when a new tube is required, it can easily be installed by anyone, without vulcanizing or cementing. The tube is moulded to fit the inside of the metal shell, which forms its support and backing.

Operating Principle

The Squeegee operating principle consists of a rotating drive shaft, keyed to an "off center" rotor, which itself is keyed to an adjustable eccentric, the adjustments providing adequate take-up for wear on the tube. The shaft and both rotors all turn as a unit inside the compressor ring, thus pushing the ring out radially against the tube. This action continues progressively along the curved portion of the tube, producing a rocking squeegee action from suction to discharge side. Compression of the Tube advances the liquid or gas, while expansion of the tube, back to its normal diameter, produces a high vacuum which inhales more liquid, which will be exhaled in the following cycle of the "breathing-pumping" action. A tube guide plate, attached to the discharge side of the compressor ring, prevents expansion of the tube beyond its normal diameter at this point under pressure, where the tube is not surrounded by the pump housing or the compressor ring.

The Squeegee pump requires no foot valves, no priming and no stuffing boxes. Its simplicity and sound engineering construction assure reliability under the most difficult pumping conditions



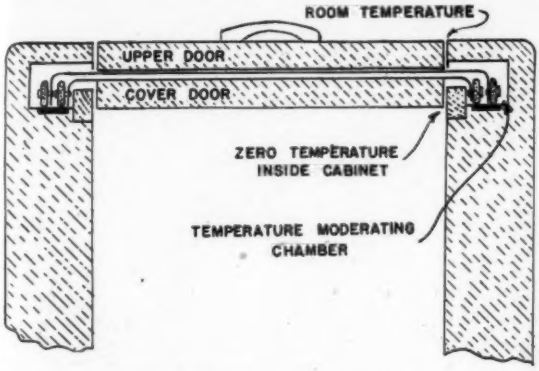
Start ¼ Cycle ½ Cycle ¾ Cycle

Civilian and Military Alike

New and Improved Appliances

Miracle Rolling Door Cabinets

CALIFORNIA Body and Cabinet Mfgs. Ltd. have perfected a new roller door cabinet with the rollers concealed in the walls of the cabinet. The construction is being used in the line of "Z-ro" frozen food cabinets manufactured by the company.



Frozen food cabinets have been a specialty of the company for the past two years, but according to John M. Schlemmer, refrigeration engineer they were never satisfied with their lid construction or the old step type of lid. Consequently they developed a new door with the rollers concealed in the walls of the cabinet.

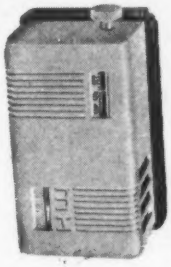
This construction gives a more massive top edging of Monel Metal and no steps. Other constructional features are thermo-pane glass doors so the contents of the box are easily seen; a Lumiline bulb mounted on a sign board lights up the interior; a split refrigerant circuit so that refrigerant circulates from one end along both sides to an accumulator on the other end; a new hermetic compressor which can be serviced in the field.

The cabinets are made in two sizes, 10 cubic feet and 15 cubic feet. They are available with either glass top or stainless steel tops.

Two M-H Thermostats

TWO new thermostats of horizontal design are announced by Minneapolis Honeywell Regulator Company.

These thermostats are available in two types, one for heating applications, the other for heating or cooling. They have been purposely designed for use where accurate and dependable control of line voltage, heavy duty devices are involved and are capable of handling directly large motor driven units, cold blowers, cooling equipment, industrial and commercial stoker fired heating plants, etc. On larger or polyphase motors they should be used in connection with magnetic starters. Where desired, of course, they can be used in low voltage circuits.



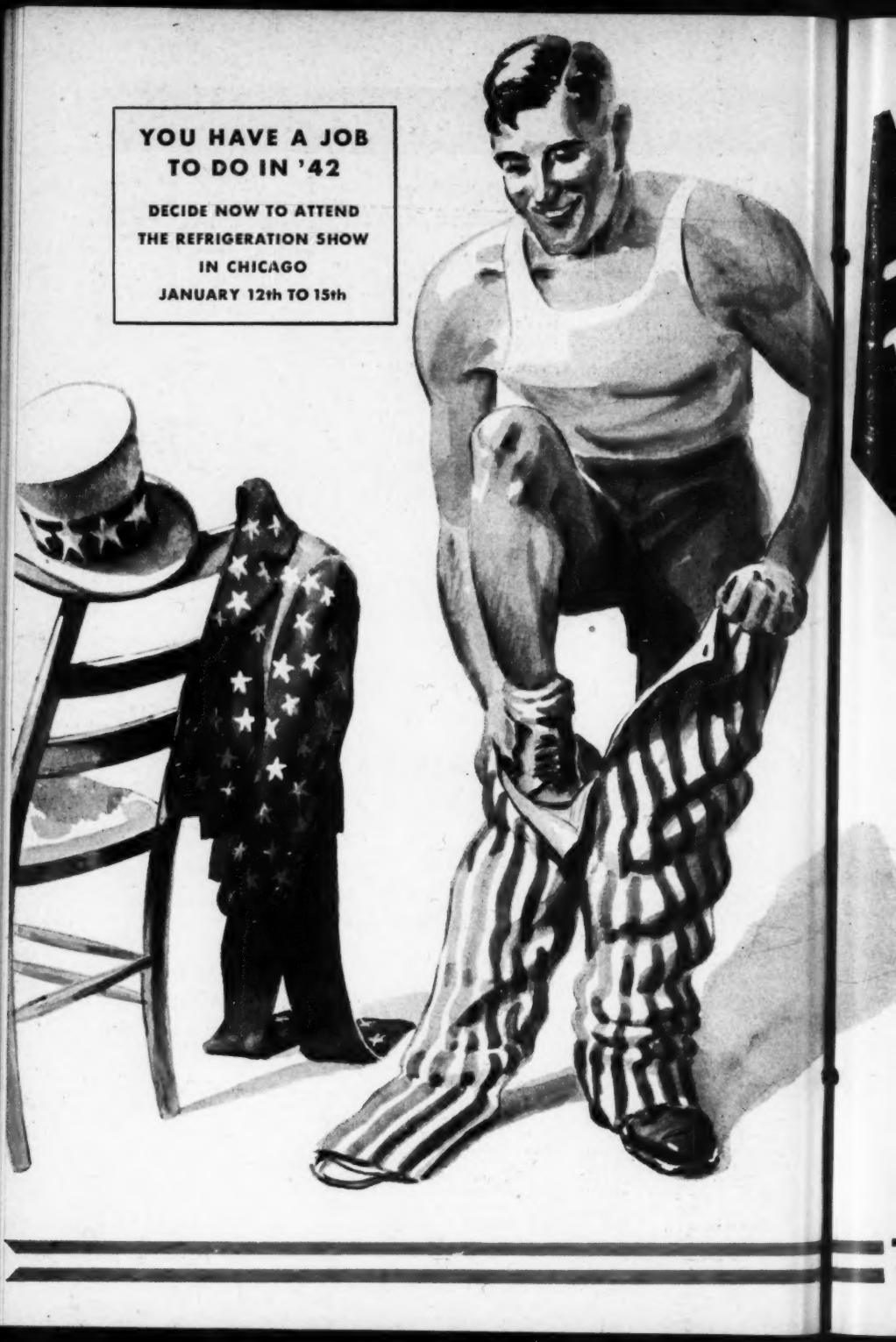
The horizontal design provides maximum air circulation and greatly reduces the effect of contact heat. The new M-H Con-Tac-Tor Snap-Switch provides the switching action. This is a non-magnetic switch, self enclosed to protect it from dirt, dust, moisture and grime, and has been proved by exhaustive tests to be capable of years of dependable service. Another distinctive feature is the temperature setting knob which can be removed to lock the thermostat in order to prevent unauthorized tampering. Models are also available with a "positive on" feature for cooling applications.

Circulator Dries Up Wet Refrigerators

MANY cold storage refrigerators are troubled with moisture on walls and ceilings, making them unsanitary, foul smelling and expensive to operate. Such conditions result in food spoilage and shrinkage.

A new air circulator has been developed for installing on the ceiling which works like magic, drying up the refrigerator in a few hours.

(Continued on page 50)


YOU HAVE A JOB
TO DO IN '42
DECIDE NOW TO ATTEND
THE REFRIGERATION SHOW
IN CHICAGO
JANUARY 12th TO 15th

Here ARE THE REFRIGERATION COVERALLS THAT FIT YOU in '42

THE difference between your present job and your 1942 one is the stripes on the pants.

Uncle Sam has defined for you the various markets for your Refrigeration Installation and Service experience. Wide awake, sales minded service men are going after AND GETTING OFFICIAL PRIORITY ORDERS from

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fedders

MANUFACTURING CO., INC.
BUFFALO, NEW YORK

New and Improved Appliances

(Continued from Page 47)

eliminating frost and ice on the coils and dissipating odors.

This is known as the Reco Refrigerator Circulator. It operates on a new principle by forcing the air up. The air travels along the ceiling room, restricting shrinkage.

Furnished with specially designed 20 inch propeller. Minimum height 15 inch. Three speeds at 1650, 1350 and 950 rpm. Blue crackle finish. Regularly furnished with A.C. 110 volt, 60 cycle

down the walls and back up the center again, providing complete air circulation throughout the room.

It takes the cold, moist air from around the coils and intermixes it with the room air, equalizing the temperature between the coils and the air around commodities stored, and increasing the relative humidity in the motor. D.C. motor supplied at extra cost. Will operate from any electric light socket.

This new circulator is made in various sizes and types to suit various conditions. Full information can be obtained from the Reynolds Electric Company, 2650 W. Congress Street, Chicago, Illinois.

Jiggers

A NEW product, Jiggers, should have instant appeal to all electricians, electrical service and maintenance men, contractors and manufacturers of electrical products. Each Jigger is a small, self-contained solder-unit that contains just the correct amount of 50-50 solder and flux hermetically sealed within a waterproof heat-generating outer shell.

To obtain a strong, perfectly soldered electrical connection, it is only necessary to push the wire splice into a Jigger and touch a lighted match to the Jigger as shown.

The Jigger shell ignites and produces the proper temperature to flow the solder into the splice. The burnt shell is then dropped off and a smooth, perfectly soldered splice is revealed. Simple, fast, clean, without waiting for soldering iron or torch to heat up. No muss or fuss. No solder pot. No waste.

To demonstrate how practical, simple and easy "Jiggers" make the soldering job, the manufacturer is offering free samples. Simply write Jiggers, Inc., 215 W. Illinois St., Chicago, Illinois.

Plastikon Rubber Putty

OF particular interest now, since so many defense emergency jobs require specialized materials that meet rigorous service requirements, The B. F. Goodrich Company, Akron, Ohio has just published a new catalog section on its Plastikon rubber putty. Copies are available upon request to the manufacturer.

The section describes the properties of the product, non-hardening, corrosion resistant, waterproof, air-tight, no mixing required, quick drying and excellent adhesion, lists the grades, gives directions for use and a large list of applications in which it has proved successful.

These latter include glazing, use in chemical plants, plumbing, air-conditioning of buildings or rooms, marine service, general construction and automotive.

Kold Hold Opens New York Branch

THE Kold Hold Mfg. Co., of Lansing, Mich., manufacturers of refrigeration plates for ice cream, frozen foods, locker plant and other industries, announces the opening of a branch office in New York City under the management of F. A. Haag. The new branch, located at 1819 Broadway, New York City, will handle sales, engineering and service for the Eastern Seaboard as far south as North Carolina, for the firm's line of refrigeration plates for trucks, cabinets, fountains and holding rooms.

In opening the New York branch, Mr. Haag stated that plans include the appointment of territory men in both Philadelphia and Boston in order to better serve the eastern area. These appointments are to be announced later.

"You"...

A STATEMENT OF POLICY

You may be a "big producer" . . . you may be a side street service shop . . . but *you*, regardless of size, are the backbone of the Refrigeration and Air Conditioning Industry and deserve a square deal *now* more than ever.

Now, with priorities, unprecedented demand and a vast shortage of many vital and familiar materials driving every phase of business into the teeth of a sellers' market . . . *Kerotest* wishes to publicly renew its standing policy of the past quarter century.

THERE IS NEVER A SELLERS' MARKET AT KEROTEST FOR *YOU*.

Consider your dealings with Kerotest . . . think of the many times you have specified and used Kerotest Valves and Fittings . . . and the 100% satisfaction and dependability connected with each and every instance. We recall these facts to you, because very trying times are at hand when *your understanding* must temper deliveries, prices, quantities, everything but *Kerotest quality*.

With priorities limiting us and demanding that we search out the validity of your orders, with deliveries to us and consequently to you, restrained and difficult, we bring you this message of faithful cooperation. Any selling or producing advantage which Kerotest may enjoy will be promptly passed along to you so that together we all may find a measure of success.

Regardless of the change in conditions . . . regardless of priorities, selling advantages and competition, *Kerotest* pledges to supply the finest valves and fittings that can be produced, each made to the Kerotest high standard of quality and dependability, delivered and marketed as quickly and economically as conditions will permit.

We repeat, you'll never face a sellers' market at Kerotest. We still know that *you* are our business and our success lies within your success.

KEROTEST MANUFACTURING COMPANY

PITTSBURGH · PENNSYLVANIA

J. C. Stocker

General Sales Manager

KEROTEST

MANUFACTURERS OF TOP QUALITY VALVES AND FITTINGS FOR THE REFRIGERATION AND AIR CONDITIONING INDUSTRY

The Question Box

Readers are invited to send their problems pertaining to the servicing of household refrigerators and small commercial refrigerating equipment to "The Question Box."

KELVINATOR K-541

QUESTION 464: This problem concerns a Kelvinator Model K-541, year 1935, 5-foot job, highside float system. The unit has a new float and a new Kelvinator compressor. The trouble is that the running time is too long. The best I can get from it is a pull-down from 28 degrees to 18 degrees in 8½ minutes, at which time the pressure on the highside is 80 pounds and the pressure on the lowside is zero pounds. The room temperature is 85 degrees, and the load on the unit is a very light one. The return line frosts three inches from the evaporator.

By taking out a little SO_2, the head pressure would drop, also the suction pressure, and the running time would increase. By adding refrigerant, the running time and the pressure would rise. The liquid line does not frost. The valves are all right and the motor is all right. I transferred gas from the cooling unit to the receiver very easily. The compressor is a 1/6-h.p.

I noticed a steady hissing in the cooling unit even 15 minutes after the unit stopped running. Is this normal? The door seal is good, although not airtight. There is a temperature valve located back of the evaporator. Frost appears on the cooling unit in a few minutes. The compressor was factory-charged, and I put three pounds of SO_2 in it.

ANSWER: To begin with, I note that you have charged the unit with three pounds of refrigerant, whereas the full charge for this refrigerator, according to my data, is 41 ounces, or two pounds, nine ounces. This difference of approximately seven ounces may make considerable change in the operating characteristics of a highside float refrigerator.

I also note that there is a hissing noise and gurgling in the evaporator for as long as fifteen minutes after the unit stops running. A certain amount of hissing noise may be normal for this type of unit; however, it doesn't seem to me that it should continue for such a length of time after the unit shuts off. There are two things that may cause the noise: one is too much oil in the evaporator, which would form a rather heavy blanket on top of the refrigerant, and the gurgling noise may come from refrigerant bubbling up through the oil; the other possibility is that your float valve is leaking, or, if it has a by-pass on it which is intended to by-pass air or high pressure gas from the top of the float around past the needle to the liquid line, this by-pass may be open too much. Either a leaky float or a by-pass opening which is too large would cause excessive running on the refrigerator, and in addition, would cause the gurgling or hissing noise.

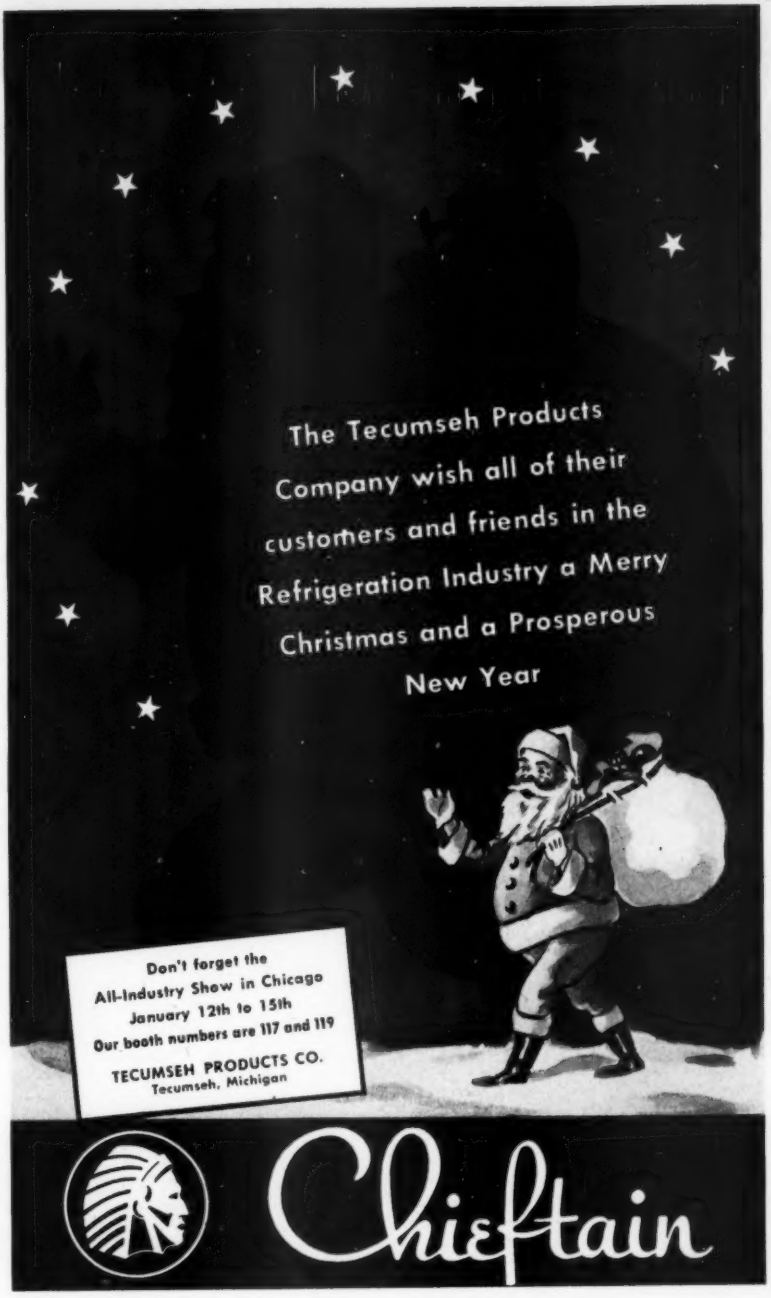
DOES THE OIL VISCOSITY AFFECT THE CAPILLARY TUBE?

QUESTION 465: I have a question I cannot find answered in any service manual nor in the REFRIGERATION SERVICE ENGINEER.

What bearing, if any, does a system using capillary tube have on the weight of the oil used? For instance, most F-12 jobs use oil of about 300 viscosity. This refers to units using an expansion valve or highside float. Would a capillary tube unit require a lighter oil? Would the 300 viscosity oil tend to cause restriction in the capillary tube? On the other hand, would a lighter oil tend to be carried in greater quantity with the refrigerant, and by having a larger percentage of oil in solution with the refrigerant using the lighter oil, would the resistance in the capillary tubing be greater than if the 300 viscosity oil were used?

ANSWER: The oil for any refrigerator unit is usually selected according to the refrigerant used in the system and the type of compressor being employed, and the allowable tolerances in the working parts of that compressor. No consideration is given to the type of liquid control used in the system, although the type of work in which the system is going to be employed may govern the viscosity of the oil. In other words, if it is very low temperature work, the viscosity may be lighter than where high temperature work is being done.

The size of the capillary tube is usually selected on the basis of the amount of refrigerant to be circulated per hour, or in other words, the amount of work to be done within a certain length of time. Therefore,


The Tecumseh Products
Company wish all of their
customers and friends in the
Refrigeration Industry a Merry
Christmas and a Prosperous
New Year
Don't forget the
All-Industry Show in Chicago
January 12th to 15th
Our booth numbers are 117 and 119
TECUMSEH PRODUCTS CO.
Tecumseh, Michigan
Chieftain

I'd be inclined to say that the weight of oil used would have no bearing on the size of capillary tubes. Any oil that is passed through the capillary tube is so thoroughly diluted with refrigerant that the difference of oil viscosity would make little difference to the rate of flow through the tube. The main effect on the capillary tube is the temperature of the air surrounding the tube, or in other words, the tube must be installed in such a manner that the oil is not permitted to congeal in the tube, thus restricting flow through it.

It is for this reason that capillary tubes are usually installed on the outside of the cabinet where the air surrounding them will be warmer than that within the refrigerator. Very often you will find that the coil of the tubing is on the outside of the refrigerator, while the tubing itself extends through the refrigerator wall into the evaporator. In other cases you will find that the capillary tube is coiled on the outside of the refrigerator and a larger size tube is continued from there to the evaporator, thus insuring no restriction between the coil and the evaporator where it passes through a low temperature area.

FORMATION OF WAX IN VALVES

QUESTION 466: I am experiencing trouble with T. E. valves, operating about zero back pressure, with Freon in ice cream cabinets, sticking shut. Changing driers or adding alcohol does not prevent this condition, and when valves are removed, about one half ounce of oil can be poured from them. The compressor uses 300 viscosity oil. Do you think the oil would thicken at this low temperature and stick the valves shut? And can the amount of oil circulating with the gas be reduced without using oil separators?

ANSWER: I am inclined to believe that your trouble with expansion valves on ice cream cabinets sticking closed may be due to the separation of wax from the oil.

Sometime ago, the Ansul Chemical Company made a considerable study of wax in oils and published the results of their tests in their bulletin No. 1, Vol. 2. Apparently, the possibility of wax separation in expansion valves has not been given very much consideration, but this could account for your particular trouble. Tests have shown that a definite separation of wax from methyl chloride or Freon 12 mixtures is obtained when these mixtures are subjected to low temperatures such as would occur at the expansion valve.

When refrigerant and oil mixtures are warm, wax may not separate, but when the same mixtures are cooled, wax will separate in sufficient quantities to plug up an expansion valve, creating a condition which is very often mistaken for moisture. Even oils which are normally known as wax-free oils, may be subject to this trouble. That is to say, oil itself may be tested for wax and found to contain none under any of these test conditions, but a mixture of oil and refrigerant will show a definite wax separation. This separation depends upon the oil used, the concentration of the oil in the refrigerant, and the temperature to which the oil-refrigerant mixture is subjected.

A Simple Test

There is a rather simple test which you might make to determine definitely whether or not separation of wax is the cause of your trouble. When you find a valve that sticks, remove it as quickly as possible, then wash it out with a small amount of carbon tetrachloride—one or two ounces should be sufficient. The carbon tetrachloride will dissolve any wax which might be present in the valve. This carbon tet can then be evaporated slowly by allowing it to stand in the air, or more rapidly, by placing it in a warmer spot. If wax was present in the valve, it will remain in your container as a white residue after the carbon tet has been evaporated. This is a very simple test and will most certainly answer your question.

Further, in this particular case, I would like to suggest that you send us a sample of, say four or five ounces of the oil in this system on which we will be able to secure a definite wax separation curve and return the results to you. This test will definitely determine whether or not sufficient wax is present to create trouble.

Taking it for granted that wax is the cause of the trouble, there are two things which will have to be done. First, it will probably be necessary to change the oil in the machine to one which the manufacturer recommends as a wax-free oil, and second, it will be necessary to install an oil separator which will cut down the amount of oil reaching the expansion valve. Changing the viscosity of the oil would have very little, if any, bearing on the situation, since the viscosity of the refrigerant oil mixture reaching the expansion valve would be changed very slightly with even a great change in the viscosity of the oil itself.

CONGRATULATIONS, refrigeration service engineers, on the enthusiastic way you've tackled the check-up service plan. Also, our sincere thanks for your cooperation in conserving "Freon-12."

Keep on plugging this check-up service to assure continuous operation for equipment employing "Freon-12." This will keep you in good with your customers. Someday you'll cash in on all the good will . . . with new business.

And keep on preventing needless waste and losses of "Freon-12." This will insure the supply for new equipment. This, in turn, means more business for you.

Let us help you... We know there's no substitute for your own practical experience. And there is literature available on handling of refrigerants. But we have lots of information on the major causes of waste and loss. So we put it all together in a convenient new booklet for you.

It's been mighty popular. If you don't have yours yet—as a guide to the profits of a regular checkup service — we'll be glad to send one. Why not write for it today?

KINETIC

FREON

REG. U. S. PAT. OFF.

safe refrigerants

*"Freon" is Kinetic's registered trade-mark for its fluorine refrigerants.

TAKE A TIP from the Chinese Doctor—who is paid to keep patients well. The "Freon" service manual will help you keep your patients thinking along conservation lines.

KINETIC CHEMICALS, INC., TENTH & MARKETS STREETS, WILMINGTON, DELAWARE

ALCOHOL IN THE SYSTEM

QUESTION 467: For the past six months I have been using pure anhydrous methyl alcohol in many Freon and methyl chloride household boxes and ice cream cabinets, in which small amounts of moisture were present. In every case, this has proven effective in eliminating the formation of ice at the point of expansion.

In most cases I have filled up the charging line with methyl alcohol and just blown it in without much regard for the amount of alcohol for each pound of gas in the system. Several of my friends say, however, that I am asking for future trouble. They say that the methyl alcohol will cause a chemical reaction in the system which will eventually damage it. They say, also, that methyl alcohol will not stop the copper plating action of moisture in a methyl chloride system.

What would you advise in regard to the use of methyl alcohol?

ANSWER: It is inadvisable to use methyl alcohol as an anti-freeze in refrigerating equipment unless every care is taken to keep the quantity of methyl alcohol well below 1% of the refrigerant volume. If this small amount of methyl alcohol is used, especially with Freon, then there seems to be slight likelihood that corrosive action of the alcohol would result in a sufficient amount of sludge to cause faulty operation of the machine. However, indiscriminate use of methyl alcohol invariably results in the formation of sludge, which is definitely due to the methyl alcohol, that causes difficulties of a type similar to those encountered where moisture has produced the formation of sludges.

A full discussion of methyl alcohol and its action in refrigerating systems was published in Ansul News Notes, Vol. 2, No. 2, to which those interested are referred.

There has been no definite relationship established between the phenomenon of copper plating and the presence of methyl alcohol in equipment. We have heard the opinion advanced that methyl alcohol induces or influences copper plating, but as far as we know, there has been no experimental proof tending to substantiate this opinion.

Walter O. Walker, Research Director, Ansul Chemical Co., Marinette, Wis.

BALANCING THE COIL AND UNIT

QUESTION 468: How can I hook up some finned coils with a blower coil, using the same valve? This installation is in a cheese-room where the desired temperature is 56 degrees F. The reason for this addition is that the condensing unit is too large for the blower coil, and in order to keep the suction line from frosting back, the back pressure must be kept too low, causing the unit to freeze over in a very short time. The condensing unit is a York, using ammonia. The valve is a manual expansion valve. Would you advise changing to an automatic or a thermostatic valve?

ANSWER: From your description, I assume that the blower coil now installed in this refrigerator is of ample size to refrigerate the box, but that the machine is somewhat too large, and you are, therefore, troubled with an unbalanced condition.

The installation of a thermostatic expansion valve would definitely improve the situation, inasmuch as it is very difficult to obtain proper adjustments at all times with a hand-adjusted valve.

A fin coil, providing it is not copper, could be used as a drier coil in series following the blower coil. In the event that you use this hook-up, I would suggest that it be installed, if possible, in the air stream of the blower coil, so that the movement of air over it will tend to keep it defrosted.

Added Coil Will Increase Difficulty

Adding this coil, of course, will increase the amount of evaporating surface in the system and will increase the suction pressure at which you can operate. The humidity of the refrigerator will also be increased, due to the decreased temperature difference between the air around the coil and the refrigerant in it. Because of the increased suction pressure, the capacity of your condensing unit will also be increased slightly, and I would think that the result of such changes will be a rapid cycling of the condensing unit, which may become very objectionable.

Rather than attack the problem from this end, I would think it would be better to attack it from the seat of the trouble, and that is the over-capacity of the condensing unit. If the compressor is not already a very slow-speed type, it is possible to reduce the speed, thus reducing the capacity, possibly to the extent where a better balance between the condensing unit and blower coil is obtained.

Of course, the success of any of these suggestions will depend entirely on how much too large the compressor is. If the compressor is more than one-third over-capacity, I doubt if any of these suggestions

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will be of any help, and it would be almost impossible to reduce the speed more than one third. In the event that the capacity is greater than any of these suggestions can correct, it may be worth while attempting to sell the customer an ice-maker, or some other usable fixture which would use up the excess capacity of the condensing unit. In this way, the customer would derive some benefit from this excess capacity, and you would be more successful in balancing the load on the condensing unit.

FACTOR OF CORNSTALKS

QUESTION 469: I have a problem to solve, and I feel your engineering department will be of assistance to me. I wish to know of the insulation value of finely ground cornstalks, that is, perfectly dry stalks. I have seen some of it ground very fine, and it looks as though it would make a very good insulation. How would it compare with wood shavings? They use a lot of shavings here in locker plants, about 12 inches thick, and I think cornstalk would be even better if you used about a 12-inch thickness. A refrigeration man recommended 12 inches of cornstalk insulation with moisture-proof paper on the inside and outside of the walls. Do you think this would give satisfactory results?

ANSWER: It is rather difficult to state definitely the K factor for such materials as cornstalks finely ground. There is, apparently, very little information available on materials made from cornstalks, and the description of these does not contain enough information that one may make a fair comparison of densities and insulating qualities. I am going to give you the information I have been able to find, however, and perhaps you may determine for yourself just how good the material you have at hand would be.

CORN STALK PULP

DENSITY	K
.32	.254
.49	.266
.49	.280
.62	.273
.62	.304
.77	.285

One reference states the density and K factor for cornstalk pulp; whether or not a finely ground cornstalk, such as you refer to, can be compared favorably with pulp is more than I know. However, the densities which follow may give you a lead or a comparison. Incidentally, the densities are based on the pounds per board foot. The K factors are B.t.u. per hr. per°F. per inch thickness per square foot.

Another reference refers to chopped corn fodder which has a density of 8.17 pounds per cubic foot and a K factor of .345 per 1½" of thickness. As a matter of comparison, you will find that planer shavings from various woods having a density of 8.74 pounds per cubic foot, have a K factor of .40. Palco (redwood) wool has a K factor of .255, while corkboard has a K factor of .288.

Apart from these insulation values, there are the other considerations, such as the ability of the material to absorb moisture, the possibility of its rotting in the future, and of vermin getting into it, and the possibility of settlement, which would perhaps decrease the insulating value in time.

I would think that corn stalk pulp may attract vermin to quite an extent, and the moisture factor may become quite a problem, even though you may use waterproof paper to encase the insulation.

Planer shavings, of course, are not much better in relation to these factors, but often, planer shavings are treated so that they do at least eliminate the attraction for vermin and are less inclined to absorb moisture.

S S S

HARDENING DRILLS

HARDENING an ordinary drill in sulphuric acid makes an edge that will cut tempered steel or facilitate cutting hard rock. The acid should be poured into a flat-bottomed vessel to a depth of about ⅛ inch. The point of the drill is heated to a dull cherry red, and dipped in the acid to that depth. This makes the point extremely hard, while the remainder remains soft. If the point breaks, reharden but with a little less acid in the vessel.

S S S

Albert Galt,
Burnaby, B. C., Can.

I find the book very interesting and will not be without it.

Glenn Hipskind,
Wenatchee, Washington.

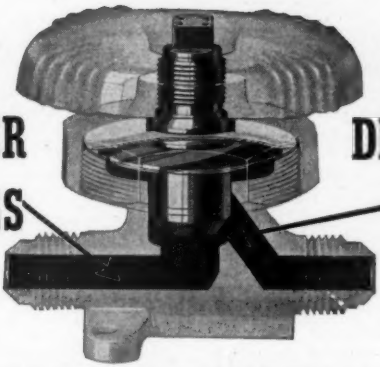
Every issue seems to be just a little better.

WEATHERHEAD

★ PACKLESS VALVES ★

Full Capacity FOR *Refrigerant*

LARGE DIAMETER OPENINGS



LARGE DIAMETER SEAT

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THE WEATHERHEAD COMPANY, CLEVELAND, OHIO

Refrigeration Valves, Fittings and Accessories

Refrigeration Service Engineers' Society

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To further the education and elevation of its members in the art and science of refrigeration engineering; for the reading and discussion of appropriate papers and lectures; the preparation and distribution among the membership of useful and practical information concerning the design, construction, operation and servicing of refrigerating machinery.

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(Continued on page 62)

STATEMENT OF POLICY

We are now building refrigeration equipment—extremely important equipment—for the Defense Program. As time goes on we will, more than likely, devote a greater portion of our facilities to this program.

However

We are still manufacturing standard equipment for our customers. This standard equipment may be produced in smaller quantities than heretofore and may be redesigned to meet existing raw material conditions but it will still be "TEMPRITE" equipment.

We may not be able to continue "business as usual" but we are going to do our darndest to carry on, both on defense work and on civilian requirements.

We guarantee that

The defense program has first call on our engineering and production facilities.

Whatever percentage of civilian production can be maintained will be distributed as fairly as possible to our regular customers.

Quality of Temprite equipment will be maintained regardless of changes in material or design.

★ ★ ★

(Continued from page 60)

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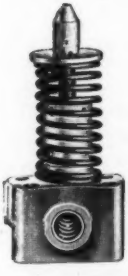

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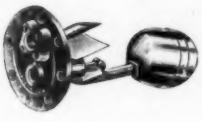

Season's Greetings

IN these times of sober thinking and effort directed toward insuring a complete victory for democracy, we pause, during this season when "peace on earth—goodwill toward men" should prevail, to affirm our faith in the fundamental principles of freedom—bereft of all hate and prejudice.

To our RSES members everywhere—on this continent and abroad in the countries of our Allies, we send these holiday greetings to you and yours with the fervent hope that a year hence may see our complete victory much closer to realization.

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Since our last meeting industry has had some conception of the problems facing it in the shortage of critical materials and in many cases the entire course of business has been changed in order to meet this emergency problem.

With the declaration of war by our Government we fully realize that the one objective of every individual is to see that the war is successfully prosecuted to an ultimate victory. We will have to forego many of the things we have been accustomed to. The President in his address to the nation reminded us that the situation regarding metals is critical and that many of the materials normally used in the manufacture of some equipment will have to be given up for the duration.

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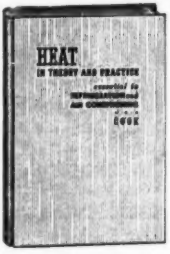

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With such words as priorities, allocations, restrictions and substitutions now included in the service and maintenance engineer's dictionary, the 8th annual convention will be of the utmost importance to all members. Non-members of the R.S.E.S. are cordially invited to all meetings and participate in the educational program.

Refrigeration Engineers Have Big Job to Do

Without question refrigeration engineers will be asked to do a bigger job in maintaining the refrigerating equipment so essential in preserving the food for our armed forces as well as our civilian population so that the morale and health of the nation is not impaired in this critical time. It is safe to assume that it will be necessary for us to do more with less. Developments have been happening fast. We cannot get too much information as to how the refrigeration service and maintenance man will change his method of operation to meet the present conditions.

Attend to Get Latest Information

For no other reason than the very important one that the 8th R.S.E.S. convention will bring to its members such important information is reason enough for you to consider your attendance at this meeting one of the necessary things you can do to help yourself. For many months the Board of Directors, officers, and program committees have been busily engaged in arranging the program, recognizing the urgency of the

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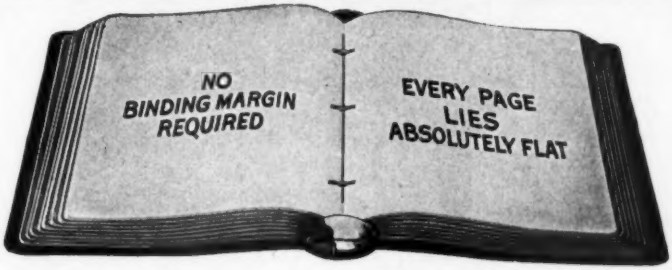

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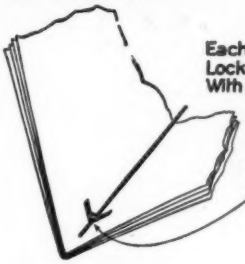

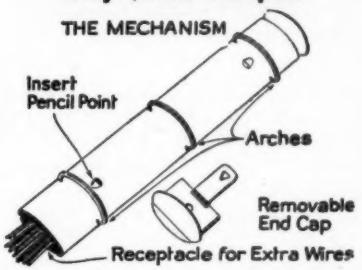

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situation and how essentially necessary it is that our members be provided with current and authentic information. Consider your convention trip one of the important business investments you should make. From this convention will be gained information that cannot be purchased through any other source.

All Industry Show

With this viewpoint in mind the manufacturers represented in the All Industry Refrigeration Exhibition sponsored by the Refrigeration Equipment Manufacturers' Association have arranged their exhibits to provide educational information as to what

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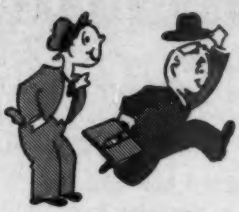

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steps they are taking in the present emergency to see that both defense and civilian requirements are supplied as effectively as possible.

Refrigeration Defense Day

One of the highlights of the convention will be the "All Out Refrigeration Defense Day." This meeting will be a combination of all the branches in the refrigeration industry to get first hand information from key Government men in charge of refrigeration and other important Government branches as to what steps are being taken to see that refrigeration gets a fair allocation of the available materials. Many of these men are important leaders whom you have learned to know through the daily press.

Tuesday has been set aside so that they can discuss with our group as well as manufacturers and jobbers, the problems confronting business today and how best we can serve in the present emergency. Here is a real opportunity to get factual information. You should join with the industry in this "All Out Refrigeration Defense Day" to hear these national speakers.

RSES Tentative Educational Program

Monday, January 12

8:00 a. m. to 10:00 a. m. Registration.

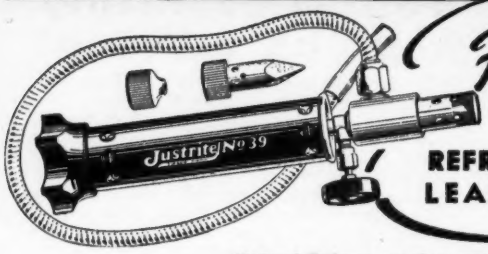
10:00 a. m. Convention called to order by James J. Kline, President, Illinois State Association, R.S.E.S.

10:15 a. m. A message from the President of R.E.M.A.
E. A. Vallee, President.

10:30 a. m. Introduction of National Officers—
Address by President E. A. Plesskott, St. Louis, Missouri.
Secretary's Report—H. T. McDermott, Chicago.
Treasurer's Report—S. A. Leitner, Kansas City, Missouri.
Report of Committees.
Advertising Committee—Willis Stafford, Chairman, Chicago.
Suggested Price Book Committee—Edward A. Vadakin, Chairman, Cleveland, Ohio.

11:15 a. m. An important movie film on the subject of refrigeration.

REFRIGERANTS MUST BE CONSERVED



Find Leaks Quickly WITH JUSTRITE REFRIGERANT GAS LEAK DETECTOR

See these tools in operation at the Justrite Exhibit Booth 624 Refrigeration and Air Conditioning Exhibition

●

Hotel Stevens Chicago Jan. 12 to 15

National Defense requires great quantities of refrigerants, but there will be no shortage if waste is avoided. Justrite Refrigerant Gas Leak Detector quickly locates leaks in systems which use Freon, Carrene, and other non-combustible halide gases.

To locate leak, simply pass hose tip over refrigerating system. When leaking gas is encountered it turns the flame to a bright blue.

Simple — easy to operate. Self generating — no pumps or pressure systems. Burns clear white gasoline, benzine or naphtha.

3 TOOLS IN ONE

Remove the flexible hose and it becomes a powerful blow-torch for sweating joints and other jobs. Reducer supplied for narrow flame. Outfit also includes soldering point for attaching to burner tube, making an efficient, quick-action soldering iron.

Every service man needs this handy tool. Saves time and money.

Write for folder or see your jobber.

JUSTRITE MANUFACTURING COMPANY 2093 N Southport Ave Chicago, Ill

11:45 a. m. Appointment of Convention Committees—
Auditing Committee.
Resolutions Committee.
Nominating Committee.
Announcements.
Adjournment.

1:00 p. m. Secretaries' Luncheon Meeting. All Secretaries of local chapters or designated representatives are requested to attend this meeting.

Tuesday, January 13

REFRIGERATION DEFENSE DAY PROGRAM

9:30 a. m. Information Please.
Bring your questions. An open forum discussion on questions from the floor.

10:00 a. m. Address by representative of the Office of Production Management, Washington, D. C.

10:30 a. m. Handling and procedure of priority orders, by C. E. Borden, President, National Refrigeration Supply Jobbers Association.

10:45 a. m. "Now is the Time"—A sound movie showing how America is preparing for defense. Courtesy of General Motors Corporation.

11:15 a. m. What defense has developed in new materials for refrigeration.

11:45 a. m. Taxes—Excise taxes on refrigeration equipment and income tax.

1:00 p. m. Luncheon Grand Ball Room.
"All Out Refrigeration Defense Meeting."
Mass meeting of all refrigeration industry to hear national leaders on current vital subjects, sponsored by Refrigeration Equipment Manufacturers Association.

6:30 p. m. All Industry Banquet and Entertainment.
Grand Ball Room—Stevens Hotel.

Wednesday, January 14

SERVICE PROBLEMS SESSION

9:30 a. m. Information Please.

10:00 a. m. Brazing as an Aid to Servicing Refrigerators by R. E. Chapin, Air Reduction Sales Company, New York City.

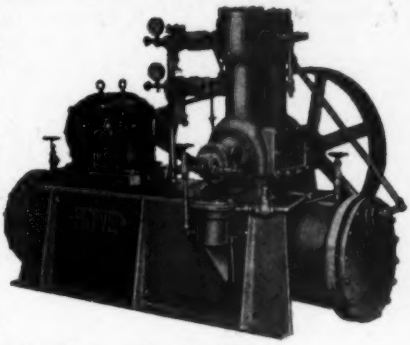
We know HOWE and what

You Need for Every Type of Cooling Installation

Believe it or not, we can supply you with your entire needs from a little ⅓ H. P. condensing unit to a 150 ton compressor.

A machine for every size of commercial and air-conditioning job.

The Howe line includes Freon and Methyl condensing units . . . a full line of Ammonia equipment . . . all types of cooling surface, such as fin coils, unit coolers, comfort coolers, water coolers, sharp freeze units, along with other items too numerous to mention.



We Lead In Refrigeration For Cold Storage Lockers

See You at the Big Show, Booth 907

HOWE ICE MACHINE CO.

2825 MONTROSE AVE. CHICAGO, ILL.

Refrigerating Machinery Manufacturers since 1912

10:30 a. m. What of Refrigeration Service and Maintenance of the Future.

11:00 a. m. Plastic materials—how will they replace metals for use in place of metal tubing.

11:30 a. m. "Perfect Refrigeration Service"—a skit by the little theater group of Tri County Chapter.

12:00 noon Reports of Convention Committee.

Auditing Committee.
Resolutions Committee.
Nominating Committee.
Election of Officers.
Unfinished Business.
New Business.
Adjournment.

9:00 p. m. R.S.E.S. Party.

All-Industry Refrigeration Exhibit

The Manufacturers' exhibition will be more important than ever, carrying out the theme of what is being done to produce vital refrigeration materials and avoid serious "bottlenecks" in the present emergency. Substitutions of materials, change of design to conserve metals are important features on which you will want to get complete information. Here's an unexcelled opportunity—the largest refrigeration exhibition under one roof, with the manufacturers' engineers in attendance to give you authentic information. The exhibit will, as usual, contain the principal manufacturers of refrigeration equipment, accessories and supplies. It will be a liberal education to you in what is being done to assure a supply of materials for the "job that you have got to do in 1942."

Educational Meetings

This year the service and maintenance engineer is being called upon to aid in the "All-Out" defense program by keeping existing refrigeration equipment properly serviced and maintained in order to release man power and manufacturing facilities so necessary in the defense program.

The educational meetings of the Society are being planned to bring to you information heretofore not available, so that you can take home many new ideas and apply them to your own service operations.

Discussions and papers will be presented by men well qualified because of their field experience. The educational program is planned for the mornings of Monday, and Wednesday, from 9:30 a. m. to 1:00 p. m., leaving your afternoons free for leisurely inspection of the huge exhibition. Tuesday meeting will feature All Out Refrigeration Defense Day.

The Entertainment

To relax mentally and provide an evening of good fellowship, the R.S.E.S. will participate in the All-Industry Banquet. The banquet will be held on Tuesday night, combining entertainment and dancing. It will be a big evening. Don't forget, too, the R.S.E.S. party for its members.

Manufacturers Who Will Exhibit at All Industry Refrigeration Show

Acme Industries, Inc.
Air-Maze Corp.
Airtemp Div.—Chrysler Corp.
Alco Valve Co.
All-Steel-Equip. Co.
Harry Alter Co.
Aluminum Co. of America
American Brass Co.
American Injector Co.
Anemostat Corp. of America
Angier Corp.
Ansul Chemical Co.
Armstrong Cork Co.
Automatic Products Co.
Black-Sivalls & Bryson, Inc.
Bonney Forge & Tool Works
Brunner Manufacturing Co.
Bush Manufacturing Co.
Business News Publishing Co.
Carrier Corp.
Century Electric Co.
Chicago-Wilcox Mfg. Co.
B. H. Clark Co.
Convention Binder Service
Copeland Refrigeration Corp.
Curtis Refrigerating Machine
Cutler-Hammer, Inc.
Davison Chemical Corp.
Day & Night Manufacturing Co.
Dayton Rubber Mfg. Co.
Deepfreeze Div.-Motor Prod. Co.
Detroit Lubricator Co.
Dole Refrigerating Co.
E. I. duPont de Nemours & Co.
Durabilt Steel Locker Co.
Electrimatic Corp.
Emery Thompson Mach & Sup.
Fairbanks, Morse & Co.
Fedders Manufacturing Co.
Gale Products
Gates Rubber Co.
General Electric—AC&CR Div.
General Electric—Motor Div.
L. H. Gilmer Co.
Grand Rapids Brass Co.
W. A. Hammond Drierite Co.
Heating & Ventilating
Henry Valve Co., Inc.
Howe Ice Machine Co.
Ideal Beer Cooler Co.
Imperial Brass Mfg. Co.
Jarrow Products Co.
Justrite Manufacturing Co.
Kerotest Manufacturing Co.
Kold-Hold Manufacturing Co.
C. F. Leaf Co.
Linde Air Products Co.
Marlo Coil Co.

DOING ONE THING WELL

BOOTH 208

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SYSTEM

DEHYDRATORS—FILTERS—STRAINERS

EFFICIENT—ADAPTABLE—ORIGINAL

Sold thru all leading jobbers.

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Modern Equipment Corp.
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Nickerson & Collins
Northern Indiana Brass
Pacific Lumber Co.
Peerless of America, Inc.
Penn Electric Switch
Perfection Ref. Parts
Polar Hardware
Portable Elevator Mfg.
Quick Frozen Foods
Quillen Bros. Ref. Co.
Ranco, Inc.
Refrigeration Appliances
Refrigerating Engineering
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Stangard-Dickerson Co.

Refrigeration and Air Conditioning are vital to defense

VISIT THE

1942 ALL-INDUSTRY REFRIGERATION AND AIR CONDITIONING EXHIBITION

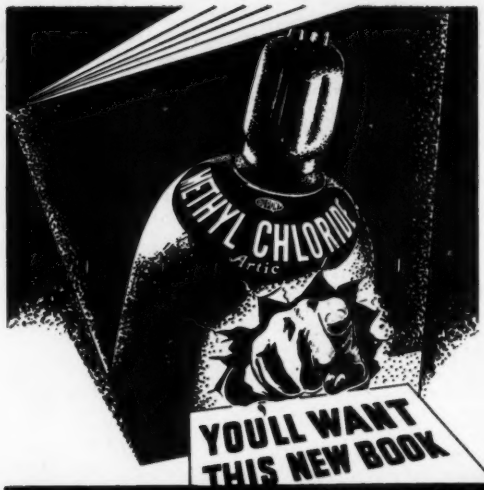
at the Stevens Hotel, Chicago, Illinois, January 12-15, 1942

Our contribution will be on display at Booths 416-418.

JAS. P. MARSH CORPORATION

2059 Southport Avenue, Chicago, Illinois

Quality Instruments and Heating Specialties Since 1865



THIS 92-page Methyl Chloride Manual contains chemical, physical, physiological and refrigerating data . . . tables of thermodynamic properties . . . engineering information . . . handling and servicing methods. Send for your free copy today!

Visit Du Pont Exhibit at the Fourth All-Industry Refrigeration and Air Conditioning Exhibition (Booths 314, 316, 318) —Stevens Hotel, Chicago, January 12-15.

DU PONT

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The R. & H. Chemicals Department
Wilmington, Delaware
District Sales Offices: Baltimore, Boston, Charlotte, Chicago, Cleveland, Kansas City, Newark, New York, Philadelphia, Pittsburgh, San Francisco

CHARLES BENSON, Chicago, Ill.
Chairman of the Exhibition Committee

Superior Valve & Fittings	Victor Mfg. & Gasket
Taylor Freezer Co.	Victor Products Corp.
Tecumseh Products	Virginia Smelting Co.
Temprite Products	I. H. H. Voss Co.
The Texas Co.	Wagner Electric Corp.
Tyler Fixture Corp.	The Weatherhead Co.
United Refrigerator	Westinghouse Elec.
Universal Cooler Corp.	White-Rodgers Elec.
Universal Zonolite	Williams Oil-O-Matic
Utilities Engr. Inst.	Wolverine Tube Co.
	X-L Refrigerating Co.

Early Equipment Wanted for "Antequarium" Exhibit

A HISTORICAL exhibit of refrigeration equipment will be displayed in the "Antequarium" at the All Industry Show.

Early models of compressors, coils, valves, cabinets, as well as old literature on refrigeration, are wanted for display purposes. If you have any piece of equipment that dates back to the early days of domestic and commercial refrigeration, communicate with any member of the "Antequarium Committee of R.E.M.A."

Members of the Committee are: F. J. Hood, Chairman; Ansul Chemical Company, Marinette, Wisconsin; George F. Taubeneck, Editor, Air Conditioning & Refrigeration News; H. T. McDermott, National Secretary, Refrigeration Service Engineers Society, 433 North Waller Avenue, Chicago.

HELPING YOU THROUGH IN '42

That's Our Pledge to Refrigeration Servicemen

We're not making this promise with the hope of performing miracles. Keeping you supplied with parts, tools, and equipment, so vital to the success of your business, is going to be a tough job . . . *but we're tackling it with our sleeves rolled up!*

So remember . . . when refrigeration parts become a lot harder to get than they are today, AIRO SUPPLY COMPANY will be exerting every effort to help you through in '42.

AIRO SUPPLY COMPANY
2732 N. Ashland Ave., Chicago, Ill.

REFRIGERATION *IS* DEFENSE
★ Defense Against Waste
★ Defense Against Food Spoilage
★ Defense Against Malnutrition

R.S.E.S. Chapter Notes

MISSISSIPPI VALLEY CHAPTER

November 18—The meeting was opened with the showing of a film produced by Highside Chemicals Company, portraying the action of Thawzone in a refrigerating system. Mr. Ferguson operated the projector and provided many comments.

On completion of the film the business meeting was called to order by President Soens. Various business matters of the Chapter were attended to and finally a report from the Educational Committee was requested. The Committee was asked to write to the Electrical Inspector of Rock Island, requesting a representative to attend the next meeting of the Chapter and give a talk on temporary electrical hookups.

ONTARIO MAPLE LEAF CHAPTER

November 7—The meeting was called to order in the assembly room of the City Dairy Company and after a brief business session the meeting was turned over to Wally Smallwood who outlined briefly the subject of the evening's entertainment.

Ches Bassford, Service Manager for the City Dairy Company, then welcomed the ladies and other guests of the evening and introduced Mrs. Baker of the Borden Company. Mrs. Baker briefly spoke on the procedure planned for the evening which was to consist of a tour through the Ice Cream and Milk Departments of the company. While the ladies were thus engaged, the men made a visit to the Cabinet and Repair Shops. This was followed by motion pictures, two in all, and finally refreshments were served.

The first picture entitled "White Magic" depicted scenes and customs of the Borden Company, leading to the more modern method of handling and inspecting the milk from the time it left the farm until it ultimately reached the consumer.

The second picture took the form of a cartoon in color, quite in keeping with the present day conditions of the world in general.

November 28—After a brief business session the meeting was turned over to Wally Smallwood who assured those present that the pictures to follow would be of considerable interest. Two movies were shown by the Canadian Red Cross Society which carried a very clear understanding of the part the Canadian people are playing in the effort to save Democracy. After the showing, Mr. Evans, a guest speaker, expressed his appreciation on behalf of the Society to the Red Cross for the time generously given.

The Educational Committee had arranged speakers for the evening, the first of whom was Alex Dawson, who talked on "Facts and Figures" which related to war time problems in the refrigeration industry. He touched briefly on the R.E.M.A. and the cooperation that might be expected from them. He also dealt with certain restrictions that are placed on the manufacturer and jobber due to material shortages.

Harry Evans was the next speaker on the subject of "Priorities" and "Rules of the Department of Munitions and Supplies."

The third speaker, Bob Henderson, outlined the difficulties being experienced by the motor industry and pointed out that many substitutions are finding their way into the manufacture and repair of motors.

The winner of the door prize ticket was Gordon Burns who received $5.00 in War Saving Certificates.

TO OLD FRIENDS
AND NEW THE
Ansul
Family
sends...

Holiday Greetings

ANSUL CHEMICAL COMPANY
SULPHUR DIOXIDE • ICE-X • METHYL CHLORIDE
MARINETTE, WISCONSIN RS

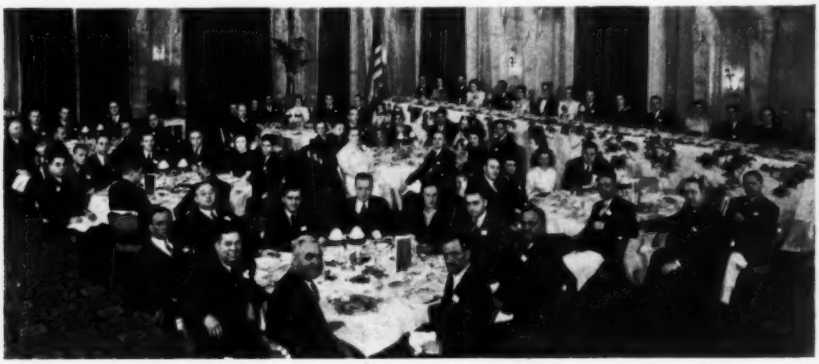
CENTRAL INDIANA CHAPTER

October 21—The business part of the evening was devoted to the annual election of officers. They are as follows: ***President,*** Herbert Hale; *Vice President*, Irmal Kruglar; *Secretary*, Vern Nold.

The first act of the new President was to appoint an Entertainment Committee consisting of Faux, Shaffer and Ripley; an Educational Committee was also appointed which consisted of Penrod and Kruglar.

November 16—Sunday the Chapter held a wiener and marshmallow roast. A fine representative crowd was present and various games were played.

On November 25 a potluck dinner was held by the Chapter at the Y.M.C.A. Building in Marion, Indiana. A large crowd was present and one of the educational features of the evening was the showing of a film from the Virginia Smelting Company.



Group Photograph of Members and Guests at New York State R.S.E.S. Association Meeting, Reported in November issue.

OUR 1942 CATALOG READY ABOUT JANUARY 1ST.

Distributors of
Sporlan Valves
Chieftain Condensing Units
Par Condensing Units
Ansul Refrigerants
Century Motors
Peerless Products
A-P Controls
Copeland Genuine Parts
Detroit Valves
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Burgess Flashlights
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When you can depend on your source of supply, half the battle is won!

You will find listed on the pages of our 1942 catalog the thousands of items vital for the refrigeration, air conditioning and heating industries. What is more significant is the fact that we have a complete stock of this merchandise and are prepared to make IMMEDIATE DELIVERY.

You can depend on "AUTOMATIC SERVICE" when you buy from AUTOMATIC.

Automatic
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This issue of our catalog is limited and will be sent on request only. To assure yourself a copy send your request to Dept. WK.

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MASSACHUSETTS STATE MEETING

On November 15 and 16 the Massachusetts State Chapter held its first annual convention at the Hotel Kenmore, Boston, Massachusetts. The convention was a success in every respect. A very fine attendance of about 150 enjoyed the program and a great deal of credit is due members of the Boston Chapter for the work they did in arranging for such a successful affair.

Saturday, November 15 was devoted entirely to early registrations and social entertainment. The program got underway on Sunday, November 16 at 9:30 A.M. State President S. B. Garland delivered the opening address and from then until 6:30 P.M. a more or less continuous program maintained the interest of those present.

Among the highlights of the day was a talk by Mr. Kurman, News Editor of the "Boston Traveller" on the 'News Today and How It Affects You and Me." This was a most interesting talk.

George B. Gardner, President of the New York State Chapter, addressed the meeting at some length and asked that the Massachusetts State Chapter combine with the New York State Chapter in a mutual convention effort in 1942.

A Variety Show lasting approximately one hour provided a grand finale of the day's enjoyment.

A general consensus of opinion was that the show was a huge success and most of those attending expressed satisfaction with the high caliber of the educational and entertainment features.

GASKETS FOR EVERY REFRIGERATION NEED
JARROW-GRAM
PREFERRED BY MFRS. JOBBERS AND SERVICE MEN
BR450 35=CHICAGO ILL DEC 10 1941 206P
JARROW CUSTOMERS=
JOBBERS, DEALERS, MANUFACTURERS=
EVERYWHERE U S A=
DON'T WORRY ABOUT GASKET SHORTAGE FOR PRESENT STOP HAVE PROTECTED YOU FOR SIX MONTHS NORMAL SUPPLY STOP NO HOARDING WILL BE PERMITTED STOP NO NEW BUSINESS BEING ACCEPTED BECAUSE OF OUR LOYALTY TO OLD CUSTOMERS=
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MOST COMPLETE LINE OF REFRIGERATOR GASKETS AND SPONGE RUBBER INSULATION

VIRGINIA CHAPTER

November 7—The meeting was called to order by the President and the business session followed. A motion was made and duly passed that the A.S.R.E. be invited to a showing of the Thawzone film to be held at the next meeting. Arrangements for the refreshments to be served were also made.

November 21—The meeting was turned over to A. R. Tiller who conducted the showing of the film produced by the Virginia Smelting Company and Highside Chemicals Company, the first of which showed the action of Thawzone in a refrigerating system and the latter showing the Virginia plant in production.

A short talk by William Andrews of the Detroit Lubricator Company followed, on present difficulties of the manufacturers in supplying jobbers with necessary parts. He urged every service engineer to cooperate with his official Society and other organizations in securing these parts.

ROCKFORD CHAPTER

November 3—One of the first items of business was the appointment of a Membership Committee by the President, consisting of George Dean as Chairman, and Ed. Wendt and C. F. McDermott as Co-Chairmen.

On the educational program E. A. Seaton introduced Willis Stafford of the Detroit Lubricator Company. Stafford gave a few pointers on Chapter operations and then discussed the seriousness of the present material shortages, outlining some of the efforts being made by various groups in obtaining parts.

November 17—E. A. Seaton, Educational Chairman, introduced Al Whittlin of the Rotary Seal Company, who gave an interesting and educational talk on Seal operation.

The Ladies' Auxiliary was then invited to join the men in viewing the motion picture of last year's National Convention shown by Herman Goldberg of Chicago.

ILLINOIS VALLEY CHAPTER

November 21—The annual election of officers was held, with the following results: *President*, Dean Reynolds; *First Vice President*, E. F. Luckert; *Second Vice President*, Roy Davidson; *Secretary*, H. P. Loercher; *Treasurer*, John H. Sackey; *Sergeant-at-Arms*, Keith Ruyle; *Educational Chairman*, Elmer Harris; *Board of Directors*, W. A. Gordon, R. M. Coyle, G. W. Dresback, Frank Walcott; *Delegates to National Convention*, Dean Reynolds, G. W. Dresback.

LOS ANGELES CHAPTER

October 22—The meeting was preceded by a dinner, during which, entertainment was furnished by Marjorie McNeal.

Mr. Irving introduced Harold Halls of Refrigeration Service, Inc., who gave an interesting talk on material shortages of the day. Following this talk petitions were circulated among the members which they were asked to have signed by their customers and to be used in an effort to obtain a better priority rating.

P. H. Askew of Refrigeration Supply discussed the matter of material shortages, followed by Gordon Clarke, who added much to the general remarks on the subject.

Maintenance More Essential than Ever Before
Copeland
DEPENDABLE Electric REFRIGERATION
Models ¼ H. P. to 25 H. P.
The FINEST in Household Refrigeration
Water Coolers
The New COPELAMETIC Unit...the Field Serviceable Hermetic ...Single and Twin
Now, the job of keeping present refrigeration installations operating is placed more squarely upon your shoulders. A constantly growing demand for essential parts and service is becoming more important daily. Be prepared to meet these new opportunities. Use genuine Copeland parts and units in your service work and you'll make satisfied customers and a good profit besides.
Copeland
REFRIGERATION CORPORATION
Sidney, Ohio • New York branch, 250 E. 43rd. Street, New York City, N.Y.

W. W. Allison provided some lengthy remarks for the good of the order and read some correspondence from the National office relating to the present emergency.

C. L. Walling was the guest speaker of the evening whose topic was National Defense. A colored movie entitled "Wild Game Hunting & Fishing in Yukon Territory," was shown by E. J. Whitlock.

CHICAGO CHAPTER

October 28—This was the first open meeting of the Fall and Winter session which was attended by approximately 122 men. President Bendl called the meeting to order, stating that business would be postponed and that the meeting would take an informal trend. The subject of the entire evening was to be "Priorities" and the difficulties created through shortages of materials.

Mr. Bendl turned the meeting over to Harry Busby who conducted the discussions from there on. A discussion of the A-10 rating given to refrigerating service parts by OPM came in for the first discussion. Irving Alter of the Harry Alter Company gave a clear explanation of the necessary procedure of securing materials under this rating, emphasizing the importance of using A-10 orders wherever it is possible to do so. Mr. Alter also stressed the importance of close cooperation among the various representative groups in the refrigeration field in an attempt to secure a better rating for service work.

H. W. Blythe brought up the matter of petitions to be circulated among consumers, suggesting that interested parties could be easily persuaded to lend their aid to the circulation of such petitions. The discussion then became quite general, covering such points as (1) materials for new installations, (2) present inventories of manufacturers', jobbers' and servicemen's stocks, (3) manufacturers' policies on rebuilding parts, and (4) procedure in securing defense orders.

Mr. Busby wound up the evening with an outline of what the R.S.E.S. has been doing on behalf of its members and the industry at large. He told of the presentation to OPM by National Secretary, H. T. McDermott, outlining the industry's service to the nation.

The closing note of the talk was to the effect that the R.S.E.S. is the only organized body representing the service group of the industry and as such, deserved the full support of every man in the service business.

November 11—This meeting was devoted almost entirely to business and a discussion of the future policies of the Chapter. Some time was devoted to the arrangement of future educational programs and upon the vote of the members it was decided to hold meetings once a month in the future instead of twice a month as has been done in the past.

Both a Nominating Committee and a Membership Committee were appointed by President Bendl.

LONE STAR CHAPTER

September 21—The meeting was called to order by Jack Langston in the absence of H. W. Cline. Very little business was done during the evening but on the educational program C. W. Barron discussed locker plants located in Tyler and Waxahachie providing load factors and temperatures maintained in each. Following this, Jack Booth and C. W. Barron lead some discussion on air conditioning.

NOW!

more than ever

VISOLEAK

should be used in every system

The shortage of refrigerant is acute and no relief in sight. You can cut the loss and waste of refrigerant — and money — to a minimum by treating *your jobs* with VISOLEAK. It costs so little and saves so much.

Visoleak Shows You Those "Hard-To-Find" Leaks In Freon Systems

● Visoleak has proven extremely useful in Freon systems due to the difficulty of leak detection by ordinary methods.

HOW TO USE VISOLEAK

Use 4 fluid ounces, plus 1 ounce for each 10 pounds of refrigerant. At the low prices listed below you can't afford to be without Visoleak, it saves you money in time, effort and refrigerant loss. Your jobber carries it, or write us direct.

PRICES

4 Ounce Can	$ 1.00
8 Ounce Can	1.75
1 Pint Can	3.00
1 Quart Can	5.00
1 Gallon Can	16.00

NOTE: *change of address*

WESTERN THERMAL EQUIPMENT COMPANY
5141 Angeles Vista Blvd.
LOS ANGELES, CALIF.

Mile High Chapter Offers Services of Group for Defense

Mile High Chapter
Refrigeration Service
Engineers Society
1524 Fifteenth Street
Den er, Colorado

December 9, 1941.

Honorable Governor Ralph L. Carr
Chairman, Colorado Council of Defense
Capitol Building
Denver, Colorado

Dear Mr. Governor:

At a regular meeting of the Mile High Chapter of the Refrigeration Service Engineers Society held at the Oxford Hotel on December 8, 1941, the following Resolution was adopted:

WHEREAS: A state of emergency exists due to the United States of America being in a state of war, and

WHEREAS: The members of the Refrigeration Service Engineers Society being Service Engineers; expert in handling toxic and non-toxic gases used in refrigeration systems, and trained to cope with emergencies arising from the release of such gases caused by fires, explosions, floods, mechanical defects, etc., and

WHEREAS: The release of such gases caused by these emergencies would endanger the preservation of perishable foods and increase fire hazards, and handicap the efforts of fire and rescue workers, and therefore,

Be It Resolved, That all the members of the Mile High Chapter of the Refrigeration Service Engineers Society volunteer their services to the Colorado Council of Defense to cooperate particularly with the Fire, Police and State Departments in such emergencies, and that a list of the members, their addresses and telephone numbers be presented with this resolution.

Respectfully submitted,

MILE HIGH CHAPTER
REFRIGERATION SERVICE ENGINEERS SOCIETY
R. C. Kimmel, *Secretary*

CENTRAL NEW YORK CHAPTER

October 15—The entire evening was spent in business matters of the Chapter in which the Secretary read a report of the year's activities and the Treasurer reported on the financial status of the Chapter.

Some discussion was had on possible meeting places for the Chapter and recommendation was made that meetings be held twice a month on the second and fourth Wednesdays if possible.

November 12—The meeting was called to order by President W. Andrews at the Polish Home Clubrooms. W. Andrews and B. Wilson gave a brief talk on the state convention held in New York.

CLEVELAND CHAPTER

October 3—A motion was made and duly passed that the dues be paid by the Chapter for any of its members who may enlist or be drafted in our Armed Forces, these dues to be carried for the duration of the emergency.

A lengthy discussion on priorities and the present day material shortages took place with much useful information coming out of the discussion.

October 23—After the usual business session in which various reports were received from the committees, some interpretation on excise taxes was given by Jim Downs. During the course of the evening a report was given on the Clam Bake which was held on October 19. According to this report the Bake was held at the Willowbeach Park and was very successful. All those who attended had a good time and the Chapter treasury benefited by the money left over.

MOUNT ROYAL CHAPTER

October 29—One of the first acts of the President was the appointment of a Nominating Committee consisting of five members.

A short demonstration on industrial chemistry lasting approximately thirty minutes proved most interesting and instructive.

The matter of priorities was discussed by B. McCullough, Mr. Boucher, Mr. Greenberg, and various other speakers of the evening.

Mr. Gendron of the Canadian General Electric Company gave his views of the situation in the industry today and stressed the importance of cooperation between the various Canadian Chapters in their effort to gain a hearing from the Government at Ottawa.

MILE HIGH CHAPTER

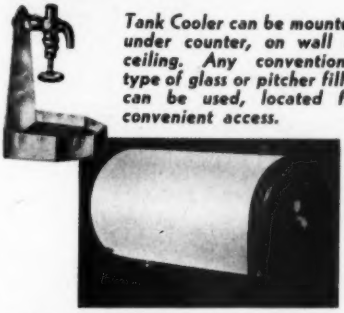
November 10—The Finance Committee made some suggestions regarding ways and means of increasing the treasury funds and along this line two of the members were appointed on a committee to arrange a stag party.

Mr. McCombs made a talk on recent developments in the material situation. He also stated that petitions provided for the purpose of securing signatures from users of refrigeration were coming in quite rapidly and it was felt that worthwhile results would be obtained through them.

The glass evaporator prepared by the Educational Committee was on display at the meeting. Different valves were tried on this evaporator and much interest was shown in its operation. It is possible through this hookup to show the best way of feeding a coil.

FOR CIVILIAN NEEDS:

Insulated Tank Coolers, such as Model CE-25 shown below, are available for prompt shipment on non-defense projects.



Tank Cooler can be mounted under counter, on wall or ceiling. Any conventional type of glass or pitcher filler can be used, located for convenient access.

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"Day & Night" supplies Storage Type Water Coolers to meet U. S. Army and Navy Specifications.

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WE SAY

"Thanks"

★ We really mean it, you service men have used *Herveen* so much during the past year that we've been working day and night. And we wouldn't feel right, at the Christmas season, if we didn't say "thanks a million." On the other hand, we feel we have done a good turn for the service man in giving him a replacement gas for Frigidaire Meter-Misers, so he can build up his business with this profitable Hermetic servicing.

★ So, here's a thought for 1942, if you have not yet used *Herveen* you owe it to yourself to check up on how you can increase your income next season. Most jobbers now carry *Herveen*, if yours doesn't, write us.

HERVEEN

MODERN GAS CO., Inc.

Manufacturers and Refiners

1084 Bedford Ave., Brooklyn, N. Y.

PITTSBURGH CHAPTER

October 17—The major part of the evening was devoted to business of the Chapter and to some discussion of future programs.

Correspondence was read and some information on priorities was provided by those present.

November 14—The meeting was called to order by President Ross. Minutes were read and correspondence disposed of. Plans were made for a future soldering contest to be held in December. A Nominating Committee was appointed by the President.

DAYTON CHAPTER

October 9—Following the business session the meeting was turned over to Mr. Yauch, who lead a most interesting and informative discussion of the methods and necessary precaution of changing from Freon to Methyl Chloride.

October 30—The annual banquet of the Chapter was held and even though it was a regular meeting date, all business matters were dispensed with.

Approximately 44 persons were in attendance and everyone seemed to thoroughly enjoy themselves.

As an added feature, colored movies were shown, one of which was a vacation trip through Alaska.

TWIN CITIES CHAPTER

October 7—Among the Committee reports that were received during the business session, Les Ost gave a report from the Rates Committee and made comparisons between rates established by the Twin Cities Chapter and those published by the Atlanta and Cleveland Chapters.

The Secretary advised the members that the telephone company is now soliciting listings under the R.S.E.S. insignia in the telephone book.

Some discussion was held on a future dance to be conducted by the Chapter and definite arrangements were reached to appoint a committee.

On the educational program a quiz contest devoted entirely to Low Sides was conducted by Sy Otterholm.

November 4—The Secretary read a petition being distributed by jobbers which was designed to secure a better priority rating on parts. President Palen outlined the procedure to be followed in handling these petitions.

In planning for the forthcoming annual election a motion was made and passed that all nominations be made from the floor rather than through a Nominating Committee.

A quiz contest again was the feature of the educational program.

ST. LOUIS CHAPTER

September 26—The entire meeting was devoted to business matters of the Chapter and to a thorough discussion of the situation created by material shortages in the present emergency.

WORCESTER CHAPTER

October 21—Future meeting places was the subject of considerable discussion and a suggestion was made that the Chamber of Commerce rooms be secured if possible. A committee was designated to contact Mr. Goddard of the Chamber of Commerce and see if permission could be secured to hold meetings in these rooms.

Mr. Tierney told the meeting of his plans and the plans of his committee for a farewell party to be held at the Sterling Inn in honor of Stuart Garland. Mr. Garland has been appointed Service Manager for Lincoln & Lane, 30 Bayley Street, Pawtucket, Rhode Island, York distributors.

COLUMBUS CHAPTER

October 23—The Fall and Winter season of the Chapter got off to a flying start with an attendance of more than 80 at its opening meeting. H. L. Scott, President, called the meeting to order and asked for a summary of activities since the Spring.

The general topic of discussion for the evening was "Taxes and Priorities as Affecting Materials Necessary in Conducting our Business." Messrs. Mason, Graff, Brethauer and Callahan lead this discussion which was later commented upon by Messrs. Litzinger and Cutheil of the Retail Grocer's Association who attended for the purpose of determining how serious the situation was and to what extent it would affect the retail grocers. Three hundred petitions were distributed among those present and in anticipation for more, more were ordered.

WICHITA CHAPTER

November 27—The meeting was called to order by President Quinn and after various business matters had been disposed of, a suggestion was made that the Chapter hold its annual dinner some time in December and that it be combined with the annual election of officers.

November 21—The Wichita Building Code was discussed by the Chapter and all the members were thoroughly acquainted with its contents.

A collapsed float taken from a highside float assembly was presented to the meeting by one of its members and a general discussion regarding the cause proved to be most interesting.

Discussion then lead to slow speed units versus the present trend toward high speed units which also brought many interesting comments.

Ladies Auxiliary

CENTRAL NEW YORK AUXILIARY

August 20—The first annual "Wiener Roast" was held at the home of Mrs. McJury, Taft Road, North Syracuse, New York, on this date.

The meeting was devoted almost entirely to business matters with no educational work being provided.

The September meeting was held in the home of Mr. and Mrs. Just. No business was discussed and the evening was spent playing cards and enjoying the refreshments served.

October 15—This meeting was held in the home of Mr. and Mrs. Paul Cross. Matters pertaining to a Halloween party were thoroughly discussed but final plans weren't made until such time as the men could join the ladies in the plans.

Refreshments were served by Mrs. Cross with the help of Mrs. Thorne and Mrs. Andrews.

October 29 was the date of the Halloween party held at one of the leading restaurants with all those attending having a thoroughly enjoyable evening.

Dinner was served about 8:00 o'clock and games were played. A peanut race was won by Mrs. Schwartzberg and a pie-eating contest was won by Mr. John Wicks. Mr. Just was the first to sink his teeth into a suspended apple and Mr. Schwartzberg contributed by telling fortunes. Mrs. Cross entertained with a Gypsy Waltz and Mr. Harder provided several numbers on the Ocarina. Both Mr. and Mrs. Harder were very entertaining with their interpretations of hillbillies. The balance of the evening was devoted to dancing.

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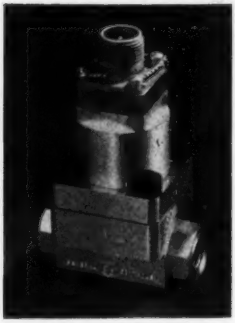
NOW AN ELECTRIC VALVE for TIGHT SHUT-OFF ON VIBRATING AND MOVING EQUIPMENT SUCH AS REFRIGERATOR TRUCKS, DINING CARS, ETC.



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Direct current.
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Packless.
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Work in any position.
High operating pressures.
For all refrigerants.

Write for Engineering Specifications and Valves for Test and Inspection

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267 Fifth Avenue, New York City
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SOLIDS-LIQUIDS-GASES-SOLIDS-LIQUIDS-GASES-SOLIDS-LIQUIDS-GASES

DRIERITE

Extends to you an invitation to visit us at the Fourth All Industry Refrigeration and Air Conditioning Exhibition, Stevens Hotel, Chicago, January 12-15.

Booth 105

Inquire about the "PROGRESS AND PROSPECTS OF INDUSTRIAL DRYING."

W. A. HAMMOND DRIERITE CO.
YELLOW SPRINGS, OHIO

On November 12 the Auxiliary held a stork shower for Mrs. Just. Various games were played and prizes were won by Mrs. Harder, Mrs. Miller and Mrs. Just.

ILLINOIS VALLEY CHAPTER AUXILIARY

November 21—The meeting was held at the Jefferson Hotel and opened with the Pledge of Allegiance read by the President, Mrs. Dresback.

The annual election of officers was held with the following results: *President,* Mrs. Glenn Dresback; *Vice President,* Mrs. Emil Luckert; *Secretary,* Mrs. John Sackey; *Treasurer,* Mrs. A. Don McGill; *Sergeant-at-Arms,* Mrs. Henry Loercher.

The balance of the evening was spent in playing Pinochle with Mrs. Luckert, Mrs. Shinneman and Mrs. Loercher winning the prizes.

Refreshments were enjoyed at the Coffee Shop.

KANSAS CITY CHAPTER AUXILIARY

September 9—The greater part of the evening was devoted to business matters with Christmas cards being distributed and sold among members. Some fancy work contributed by the Auxiliary was also sold.

MISSOURI VALLEY CHAPTER AUXILIARY

October 9—The first meeting of the season was held at the home of Mrs. Cherry. No business was discussed and the meeting was quite brief, followed by playing cards.

On October 23 the Auxiliary met at the home of Mrs. Doyle and on November 6 the ladies had dinner downtown while the men attended a stag party.

On November 20 the meeting was held in the home of Mrs. Krumrei. Pinochle occupied the greater part of the evening and refreshments were served by the hostess.

ROCKFORD CHAPTER AUXILIARY

The meeting of November 3 was devoted to quite an extent to business matters. However, time was left for entertainment which took the form of British Rummy with Mesdames Starin, Wendt and McCarthy winning the prizes.

Lunch was served after which the ladies joined the men and enjoyed a moving picture shown by Herman Goldberg.

On November 17 the Christmas party was discussed and December 14 was set as the date. Committees were appointed to take care of various purchases and arrangements for the party.

For entertainment the balance of the evening was spent in playing Bridge Keno with Mesdames Overman, Sturch and McCarthy winning the prizes.

TRI-STATE CHAPTER AUXILIARY

November 11—The meeting was held at the home of Mrs. Donald Young. A report was made on Mrs. Bruntons' recent illness and the Auxiliary voted to send flowers as an expression of sympathy.

Bingo was played in the balance of the evening and Mrs. Young served sandwiches and coffee.

Mrs. McElhaney was the hostess to the Auxiliary on November 25. The larger part of the evening was taken up with plans for a forthcoming Christmas party. Mrs. McElhaney served light refreshments.

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—don't have to take a chance when hiring men for your shop!

Write us—we'll give you the names of U.E.I. trained men in your locality—men with demonstrated ability and service knowledge.

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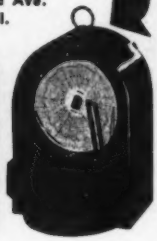


GARLAND NOW WITH LINCOLN AND LANE

S. B. GARLAND, Secretary of the Worcester Chapter and Member of the Board of Directors of the National Association, was appointed Service Manager on October 14, for Lincoln & Lane, 30 Bayley Street, Pawtucket, Rhode Island.

Mr. Garland has long taken an active interest in Society affairs and has been one of the leading hard workers of the Worcester, Massachusetts, Chapter.

Lincoln & Lane are York distributors for the entire state of Rhode Island.

* * *

NEW SERVICE ORGANIZATION FOR ROCKFORD

R. C. McCARTHY, Past President of the Illinois State Association and Past President of Rockford Chapter of the R.S.E.S., formerly with the Mid-States Industrial Corporation, Refrigeration Department, has recently opened up his own place of business, known as Mac's Refrigeration Service at 528 South First Street, Rockford, Illinois. Mr. McCarthy is well-known in refrigeration circles and has taken over the Refrigeration Division of his former company.

* * *

MILLS NOVELTY OPENS NEW PLANT

OPEN House was recently held by Mills Novelty Company, Chicago, to celebrate the opening of its new plant located at 4660 West Lake Street.

A cordial invitation was extended to all employees with the privilege of bringing one guest. A full dinner was served and approximately five thousand employees and friends attended the gala occasion.

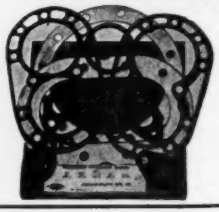
A stage was erected and a talented floor show was provided with a full orchestra that furnished dance music.

This new, beautiful, modern structure is a one-story brick building, with Monitor-type roof to give plenty of daylight throughout. This building has 140,000 sq. ft. of floor space; new features include overhead washrooms; drying or enameling ovens are located on the roof.

All production lines move in a northwesterly direction. Completed products end up in this part of the building, which is the

STOP IN AT BOOTH No. 106

See Our Display "GASKETS FOR DEFENSE"



This will be one of the most interesting displays in the whole exposition, showing how Chicago-Wilcox, the pioneers in the field, are serving the defense industries with all types of gaskets. Step right up and say "Howdy" to E. J. Zoll, he'll be there to greet you and to help you.

CHICAGO-WILCOX MANUFACTURING CO.

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Shipping Department. Maintenance and checking of tools and gauges are made in a tile enclosure, air-conditioned so as to maintain a constant temperature and remove all dirt particles from the air. All parts are inspected with micrometer gauges and some tolerances are maintained at one ten-thousandth of an inch.

Mills condensing units, coca-cola vending machines, and Mills freezers will be manufactured in the new plant.

REFRIGERATION MUST HELP WIN THE WAR

"REFRIGERATION must help win the the war and also win the peace", says Ernest Niederer, President of Refrigeration Appliances, Inc., Chicago, manufacturers of the well known line of "Krack" coils. "Those of us in refrigeration may consider our industry of prime importance not only in the present essential position of preserving perishable food but what our position will be in the post war period. We may expect that refrigeration among all industries will maintain its important place during this post war period because of the new applications which now are in their infancy but will be given added impetus later, continued Mr. Niederer.

"While we have been hampered somewhat by our expanding business and scarcity of materials, nevertheless we have made it a point to serve our regular customers in the best manner possible and will continue to do so to the limit of our ability."

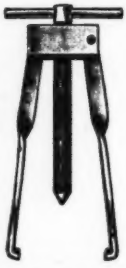
Refrigeration Appliances, Inc. has been identified with the growth of commercial refrigeration industry during the past decade, having been established in 1931 by the late H. J. Krackowizer. Today the modernly equipped plant occupies 60,000 sq. ft.

John Eichhorn, Factory Manager, has been responsible for the design of many of the popular "Krack" coils for which Refrigeration Appliances, Inc. is well known. Harry Bargeman is Sales Manager and Hugh H. Smart, Sales Engineer.

SERVICE PARTS COMPANY TO EXPAND

FOR the third time in the four years they have been in business, Service Parts Company of Melrose Park, Illinois, find it necessary to expand their quarters. This time it has become necessary to move to a new location where future expansion can be planned for.

A PERFECT ROTARY SEAL JOB ASSURED WITH **SCHULTZ SEAL RING PULLER**



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PULL THE TOUGHEST SEAL RING

WITHOUT MARRING THE SHAFT

ESPECIALLY USEFUL TO PULL

INSIDE NORGE SEAL RINGS

For Sale by Your Refrigeration Jobber

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DEHYDRATORS and STRAINERS

WATER REGULATORS
Pressure-actuated, renewable seat, ⅜", ½", ¾" pipe fittings.

SHUT-OFF VALVES
Semi-steel, carbon-steel, double-seated stem, Angle and Globe type.

ALL STEEL GAUGE SETS
Safety ball seats shut off liquid in case of glass breakage.

DEHYDRATORS
Furnished filled with Calcium Chloride, Activated Alumina, or Drierite; and Silica Gel.

STRAINERS
Cylinder and Cone types, and liquid line seals trap.

ALL-STEEL LINE VALVES
Compact in design, completely rust-proof Angle, Tee and Globe types.

CYRUS SHANK COMPANY
625 West Jackson Blvd., Chicago, Ill.

In announcing the contemplated move, Service Parts Company revealed its purchase of a building 175 feet long and 60 feet wide, containing 10,500 square feet of floor area. The new location will be at 25th Avenue and Lake Street, Melrose Park, Illinois.

In addition to this building they have purchased adjoining lots with a total of 320 feet of frontage on Lake Street, U. S. Route 20. According to present plans, the company will move from its present location to the new building and be opened for inspection by January 10, 1942.

A complete display of all refrigeration units, parts and supplies will occupy approximately 4,000 square feet of the new quarters. About 6,500 square feet will be devoted to one of the most up-to-date shops for rebuilding hermetic and other refrigerating units. Compressors, evaporators, controls, etc., will each have their rebuilding department.

Alterations of the new quarters are going forward rapidly and Service Parts Company issues an invitation to all men to inspect their up-to-date plant while attending the Annual Convention in Chicago January 12-15.

PHILCO ANNOUNCES NEW SERVICE PROGRAMS

TWO new service programs—for refrigeration and air conditioning equipment—were recently announced by Philco Corporation. Patterned after Radio Manufacturers Service in many respects, Philco executives anticipate that the new service plans will become as important to the refrigeration and air conditioning industry as RMS is in the field of radio.

First step in putting the service programs into operation will be the selection of service men or service organizations having the equipment and experience necessary to qualify as authorized Philco Service Stations. Detailed applications must be filled out and approved by the home office in Philadelphia and no application will be approved until a personal inspection has been made by a Philco distributor's service engineer.

Since it is anticipated that the servicing of all Philco refrigerators and air conditioning equipment in the country will be done eventually by this group, its members are being selected with great care. Only service men well qualified by training and experience will be accepted.

HERMAN GOLDBERG CO.

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RANCO CONTROLS — ANSUL REFRIGERANTS

Standard Evaporators • D. F. N. Dehydrators
Chicago Seals

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THAWZONE

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Thawzone is the only product that hunts down trapped moisture and destroys it wherever found. Ask your jobber.

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COLD CONTROLS & EXPANSION VALVES
repaired or exchanged
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Automatic Expansion Valves (All Makes)	$1.25
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Commercial Controls (Temp. or Pressure)	2.50
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ALL WORK GUARANTEED FOR 90 DAYS
Write for quantity prices
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Visit Reco Booth No. 902 at the Refrigerating Exhibition, Chicago, at Stevens Hotel, January 12-15th, and see the Reco Refrigeration Circulator in operation. It dries up wet walls and ceilings, dissipates odors, restricts food shrinkage and spoilage and prevents formation of frost and ice on coils.

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VISIT US *while in Chicago*

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★ **Prompt Service on Refrigeration Supplies** ★
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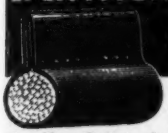
Authorized Philco service stations in both the refrigeration and air conditioning fields will receive without cost a steady flow of service bulletins from the home office describing details of installation, operation and other technical information essential to general service. Meetings will be conducted for members by the Philco Field Service Engineers to introduce new models and to explain design, engineering, operation and servicing. Authorized service stations will be given a service certificate to be displayed in the shops, and every man on the service staff will receive an identification card. Philco distributors' service and parts department will act as local headquarters where first hand information and parts will be readily available.

With the formation of service programs for refrigeration and air conditioning, Philco now offers four service plans to the home appliance industry. Radio Manufacturers Service, which in a few years has built up a membership of 30,000, has been of tremendous influence in improving service standards in home radios and auto radios. The two new service programs will naturally benefit from the vast experience Philco has gained through RMS in the field of radio.

MILLER & SEDDON, INC. MILLS DISTRIBUTOR

F. E. JERNBERG, Sales Manager of the Commercial Refrigeration Division of the Mills Novelty Company, Chicago, Ill., announces the appointment of Miller & Seddon, Inc., 2089 Massachusetts Avenue, Cambridge, Mass., distributors for Mills Commercial Refrigeration Products in the New England States. Richard (Dick) Seddon is treasurer of this company, and formerly District Sales Manager for the Mills Novelty Company in the New England territory.

DENNIS GASKETS
FOR ALL MAKES REFRIGERATOR DOORS



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2817 LACLEDE AVENUE, ST. LOUIS, MO.

Complete Stock of
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Because of the shortage of materials, 1942 will be a very busy one for the Service Engineers. Fewer replacement parts will be available, necessitating more repairs.

Why not send your control jobs to us? We recondition controls equal to new at a small cost. All our work guaranteed for one year. Prices on request.

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342 West 70th Street
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Rate: Two Dollars for fifty words or less. 30 cents for each additional ten words or less.

FOR SALE—Two Frick late model 10x10 vertical compressors, each with 100-h.p. AC motors, starters, etc. Also one Frick 7x7 vertical with 30-h.p. 230 volt DC motor. Equipment still erected. Equipment includes Marley 600-g.p.m. water tower, four Frick multi-pass condensers, two receivers, various pumps, motor controls, switches, traps, and over 5000 feet ammonia pipe and fittings. Available for inspection in the Cataract Brewing Co., Rochester, N. Y. Inquire of Charles S. Jacobowitz Corp., 1432 Niagara St., Buffalo, N. Y.

FOR SALE—One York 100 ton twin vertical duplex with AC synchronous 220 volt motor, starters, controls, two 30" by 16' York condensers, one York receiver, complete accessories and fittings all equipped and erected in the brewery for inspection at the Seitz Brewery, Easton, Pa. Also one 25 and one 50 ton De LaVergne steam driven units. Name your price on these. Charles S. Jacobowitz Corp., 1432 Niagara St., Buffalo, N. Y.

BOOKS FOR SALE—Write to Nickerson & Collins Co. for a complete list of books on Air Conditioning, Refrigeration, Ice Making, Cold Storage, Food Handling, Heating, Diesel, Oil, and Steam Engines, Domestic and Small Commercial Machines, and others. These are the best books published today on Refrigeration and related subjects. Nickerson & Collins Co., 435 N. Waller Ave., Chicago, Ill.

STATOR Rewinding
for all types of hermetically sealed units our specialty

Complete stock of rewound stators for G. E., Grunow, Majestic and other refrigerators for immediate replacement.
Write for prices.

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DOMESTIC — COMMERCIAL

Cold Controls • Pressure Switches Expansion Valves

Reconditioned in one to three days with an unconditional one year guarantee.

Original Factory Specifications

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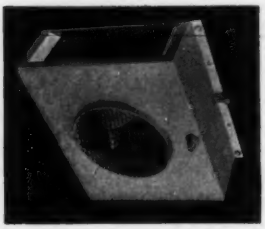

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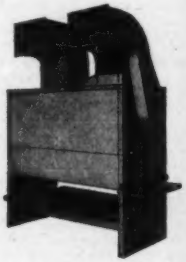

REFRIGERATION APPLIANCES, INC.

923 W. LAKE ST. CHICAGO, ILL.

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January to December, 1941 **Volume Nine**

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